

***Androscoggin River and Gulf Island Pond
Water Quality Monitoring Report
2006***

Prepared For:

***NewPage, Rumford, Maine
Verso Paper, Jay, Maine
Livermore Falls, Maine
November 30, 2006***

Prepared by

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1.0 Introduction

On or about September 21, 2005, the Maine Department of Environmental Protection issued MEPDES permits to Rumford Paper Company (NewPage) in Rumford, Maine, International Paper Company (now Verso Paper) in Jay, Maine and the Livermore Falls POTW in Livermore Falls, Maine. Each of the permits contains the following requirement concerning ambient water quality monitoring in Gulf Island Pond.

AMBIENT WATER QUALITY MONITORING

By February 1st of each year (beginning February 1, 2006), [PCS Code 22099] the permittee shall independently or in conjunction with other parties, submit an updated ambient water quality monitoring plan for that year to the Department for review and approval with or without conditions if the monitoring plan is different than as specified in this section.

Between June 1 and September 30 of each year (beginning June 1 2006) [PCS Code 90101] the permittee shall independently or in conjunction with other parties participate in ambient water quality monitoring of Gulf Island Pond and/or designated segments of the Androscoggin River at a frequency of 1/Week. There must be at least 72 hrs between sampling events. Samples for total phosphorus, ortho-phosphorus, chlorophyll a, secchi disc readings and dissolved oxygen/temperature profiles at one-meter increments and physical observations shall be taken at five (5) sampling stations. The sampling stations are designated as Twin Bridges, Upper Narrows, Lower Narrows, Gulf Island Pond 4 and Gulf Island Dam (deep hole). Sampling procedures must be consistent with the protocols established in a document entitled, Androscoggin River & Gulf Island Pond Water Quality Monitoring Plan 2004, Acheron, May 2004 or the most current revisions to said plan approved by the Department.

By November 30th of each year (beginning November 30, 2006), [PCS Code 90199, 90299, 90399, 90499] the permittee shall independently or in conjunction with other parties, submit a written report to the Department summarizing the results of the monitoring for that year. The report shall include, but not be limited to, all the field data and any pertinent field observations (algal blooms in particular), a statistical analysis of the field data and interpretation and/or conclusions drawn from the analysis and/or data and any recommendations for revisions to the monitoring plan (if appropriate) for the following year.

This report is intended to satisfy the requirement for a written report. This report is provided in two forms. One is in written form that includes the text of the report with selected charts, graphs and figures. The second form is in CD format and includes lab and field results spreadsheets that are too large to provide in the text.

The following sections of this document describe the scope, methods and procedure used to implement the 2006 Androscoggin River and Gulf Island Pond Water Quality Monitoring Program in accordance with the provisions of the permits. The first section is an executive summary of the substantive conclusions contained in Section 5 of this report.

2.0 Executive Summary

- The average dissolved ortho-phosphorus concentration (the form of phosphorus that is necessary for algal growth) ranged from 1.5 to 2.1 ppb (ug/L) in Gulf Island Pond through the summer of 2006. The data presented in this report show that this concentration is below the critical concentration necessary to support algae blooms in the Gulf Island Pond.
- Secchi Disk transparency averaged approximately 2.5 meters throughout the Pond for the entire summer. By the definition contained in 06-096 Code of Maine Regulations (CMR) Chapter 581, there were no algae blooms in Gulf Island Pond during the summer of 2006.
- Average chlorophyll-A concentrations in the Pond ranged from 2.4 to 3.6 ppb. These levels are well below what is generally considered a bloom.
- There were no algae blooms observed by Acheron personnel during the summer of 2006.
- Dissolved oxygen and temperature measurements were obtained once per week in the morning and afternoon throughout the summer season. There is nothing particularly noteworthy about the collected data; and since this is the first year of the monitoring program, these data, collected at these locations and times, cannot be compared to historical data.

3.0 Sampling and Analytical Procedures

3.1 Sampling Sites

The following is a list of the sites sampled during the study. A map showing the location of the sampling sites is attached as Appendix A.

1. Twin Bridges (Androscoggin River)
2. Turner Bridge (Gulf Island Pond)
3. Upper Narrows – Below Diffuser (Gulf Island Pond)
4. Lower Narrows (Gulf Island Pond)
5. Gulf Island Pond 4 (Gulf Island Pond)
6. Deep Hole (Gulf Island Pond)

3.2 Analytical Parameters and Sampling Procedures

The following table provides a summary of the sites to be sampled on the Androscoggin River and Gulf Island Pond, the parameters to be sampled for, and the sampling procedure to be used. Details of the parameters and sampling procedures are provided following the tabular summary.

<p style="text-align: center;"><i>Gulf Island Pond</i> 2006 Water Quality Monitoring Plan Sampling Sites, Parameters and Procedures</p>								
Sampling Location	Analytical Parameters and Sampling Procedure							
	Total Phosphorus	Total Ortho-Phos	Dissolved Ortho-Phos	Chlorophyll-A Corrected	Secchi Disk	Dissolved Oxygen	Temperature	Physical Observations
<i>Gulf Island Pond Dam</i>	1 Core Composite from Surface to 2X Secchi Disk 9 AM to 3 PM	1 Core Composite from Surface to 2X Secchi Disk 9 AM to 3 PM	1 Core Composite from Surface to 2X Secchi Disk 9 AM to 3 PM	1 Core Composite from Surface to 2X Secchi Disk 9 AM to 3 PM	Secchi Disk Readings per DEP Protocol 9 AM to 3 PM	2 Profiles From Surface to 1M Above Bottom at 1 M Intervals AM & PM	2 Profiles From Surface to 1M Above Bottom at 1 M Intervals AM & PM	Visual Observations of Algae Density on or near the Surface 9 AM to 3 PM
<i>Gulf Island Pond 4</i>								
<i>Lower Narrows</i>								
<i>Upper Narrows</i>								
<i>Turner Bridge</i>	1 Grab 9 AM to 3 PM	1 Grab 9 AM to 3 PM	1 Grab 9 AM to 3 PM	1 Grab 9 AM to 3 PM	Not Applicable	1 Grab 9 AM to 3 PM	1 Grab 9 AM to 3 PM	Not Applicable
<i>Twin Bridges</i>								

Each sample location was marked with a white buoy during the first sampling in June. The GPS coordinates were recorded for each buoy location in case a buoy was disturbed.

Dissolved oxygen and temperature readings were obtained at one-meter intervals from the surface to one meter above the bottom of the pond using a YSI Model 85 multimeter and a YSI 550A multimeter. The multimeters were checked and calibrated as necessary in accordance with DEP protocol (copy included in Appendix B) before each sampling day and at the end of each sampling day. In addition, calibration checks were performed before and after AM and PM profiling. The calibration checks and any necessary calibrations were noted on field record sheets. In addition, the multimeters were also crosschecked with a YSI Model 55 dissolved oxygen and temperature meter at the beginning and end of each sampling day. A backup YSI Model 51B with a 100-foot cord was also available to obtain data in the event that the primary meter became dysfunctional or would not calibrate correctly. There were no instances where the backup meter had to be used. The temperature function of the meter was checked against a standard mercury laboratory thermometer in the laboratory before and after each sampling day. The degree of variation was recorded. The meters were considered to be within acceptable calibration range if the dissolved oxygen readings between the two meters agreed within 0.3 ppm and temperature to within 0.2°C. Readings were rounded and recorded to the nearest 0.1°C. The meters were calibrated and operated according to YSI O&M manuals for the meters.

Secchi Disk readings were obtained in accordance with DEP protocol. Secchi Disk readings were not obtained at Twin Bridges because conditions at Twin Bridges are not suitable to collect Secchi Disk data. The water depth is too shallow and velocities are too high to obtain Secchi Disk readings.

Samples for chemical analysis were collected using a core sampler or “sludge judge”. Samples were collected as continuous core samples from the surface of the pond to a depth of 2 times the secchi disk depth up to a maximum depth of 5 meters. An interim sampling container was filled sufficiently to allow all sample bottles to be filled from the interim container. This required approximately four liters (1 gallon) of water in the container. The water in the interim container was mixed thoroughly. The sample bottles were filled by pouring water from the interim container into the sample bottles. Both the sample container and core sampler were rinsed three times with river water from the sampling location prior to collecting samples at each sample location.

Only pre-prepared sample bottles from the laboratory were used for sample collection. Sample bottles were stored in an insulated cooler under ice immediately after sample collection. A detailed record of each sampling at each sample site was prepared in the field. Chain-of-custody forms were prepared and signed for each sampling event.

Sampling personnel made visual observations of the physical conditions at each sampling site. If an algae bloom developed, observations of the nature and magnitude of the bloom were noted on the field record sheet. If no algae bloom existed, a notation was made on the field sheet.

One field duplicate sample for each analytical parameter was collected every week. The site of the duplicate sample was rotated each week (first week-site 1, second week- site 2, etc). One field blank per week for each analytical parameter was prepared using ultra-pure distilled water. Field blanks were prepared by pouring ultra-pure distilled water directly into sample containers at the first sampling site. Field blanks were stored in the same cooler(s) as the samples, under ice, immediately after collection.

A standard chain-of-custody (COC) form was prepared in accordance with accepted protocol. Each sample was cross-checked with the COC form. A sample number was assigned to each sample and the number was added to the COC form by laboratory personnel. The COC form was signed by a laboratory technician as having received the samples with the time and date of sample receipt indicated in the space provided.

3.3 Sampling Schedule

Samples were collected at selected sampling sites on the Androscoggin River and Gulf Island Pond once per week starting on the first full week of June and ending the last full week of September for a total of 17 sampling events.

The sampling was performed on Tuesday of each week. The lone exception to this schedule was the week of July 4th, when sampling was performed on Wednesday, July 5th due to the holiday.

The AM sampling for Dissolved Oxygen/Temperature (DO/Temp) profiles began at sunrise or as close to sunrise as weather conditions allowed for safe navigation on the pond. On a few days, the sampling was delayed because of fog on the pond but the delays were brief

because the sampling crew used a GPS to navigate the pond. Following completion of the AM DO/Temp profiles at each of the sampling sites on the Gulf Island Pond (Sites 2, 3, 4, 5 and 6), sampling personnel returned to each of these sampling sites to obtain water samples for laboratory analyses, Secchi Disk readings and observation of algae condition. The sampling for laboratory analyses began at approximately at 9:00 AM and was completed by noon in accordance with DEP protocol. All of the sampling at the Twin Bridges site was done between 9:00 AM and 3:00 PM.

The PM sampling for Dissolved Oxygen/Temperature profiles began at 1:00 PM and was completed by 5:00 PM in accordance with DEP protocol.

3.4 Laboratory Analytical Procedures

The analyses for all chemical parameters were analyzed at ClearWater Laboratory in Newport, Maine. ClearWater Laboratory is certified by the Maine Department of Human Services for each of the parameters listed below. The following is a list of the analytical procedures used and the detection limit for each parameter.

	<u>Analytical Method and Detection Limits</u>			
	<u>Total Phos</u>	<u>Ortho-Phos</u>	<u>Dis. O-Phos</u>	<u>Chlorophyll-A</u>
Test Method	EPA 365.2	EPA 365.2	EPA 365.2	EPA 445.0
Detection Limit	1 ppb	1 ppb	1 ppb	1 ppb
Reporting Limit	1 ppb	1 ppb	0.1 ppb	1 ppb

All samples collected for phosphorus analysis were analyzed or preserved the same day the samples were collected. The samples for Chlorophyll-A analysis were filtered and frozen the same day the samples were collected. Filtering of all samples was performed within 2 hours of receipt of the samples in the laboratory.

Laboratory duplicates were performed according to the following procedure. One field duplicate, one laboratory duplicate and one spiked sample were performed for each parameter each week of the sampling program.

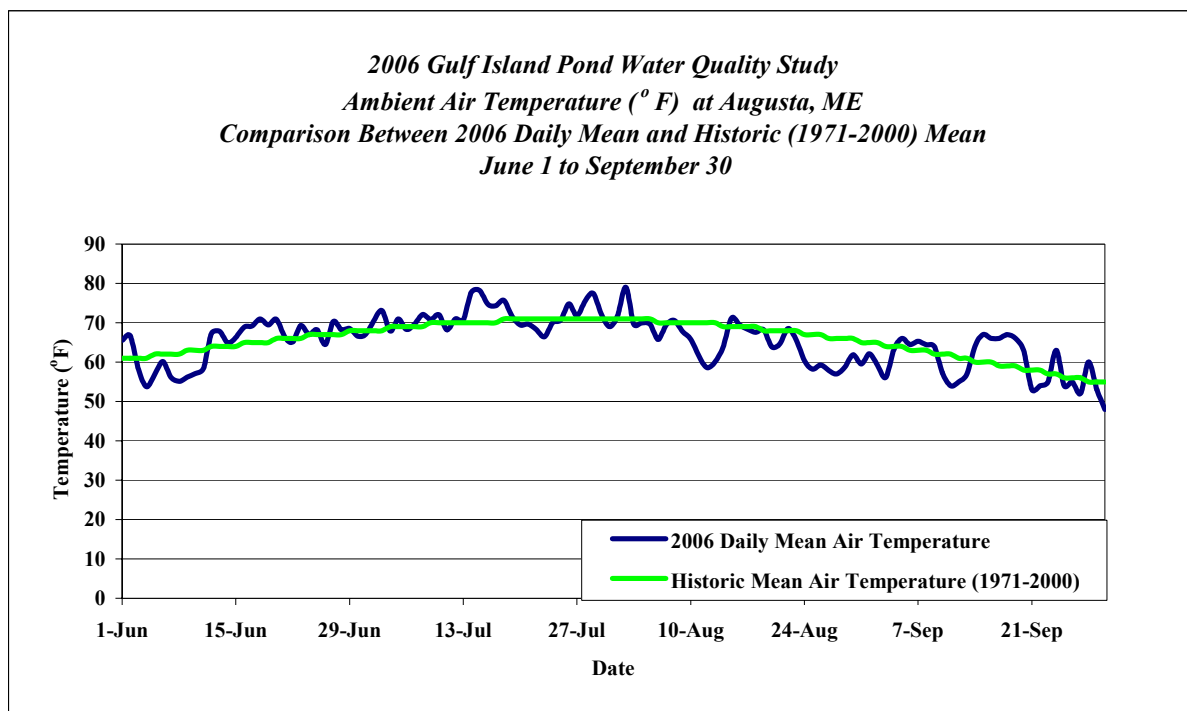
Attached in Appendix C is a copy of relevant laboratory QA/QC documents for the various analytes associated with this study.

4.0 Summary of Results

The following is a summary of the results from the 2006 water quality study of the Androscoggin River and Gulf Island Pond. This version of the report does not include all of the data collected during the study because it would be too voluminous for this format. The complete lab and field results from the study are included on the CD version located in the back pocket of this report.

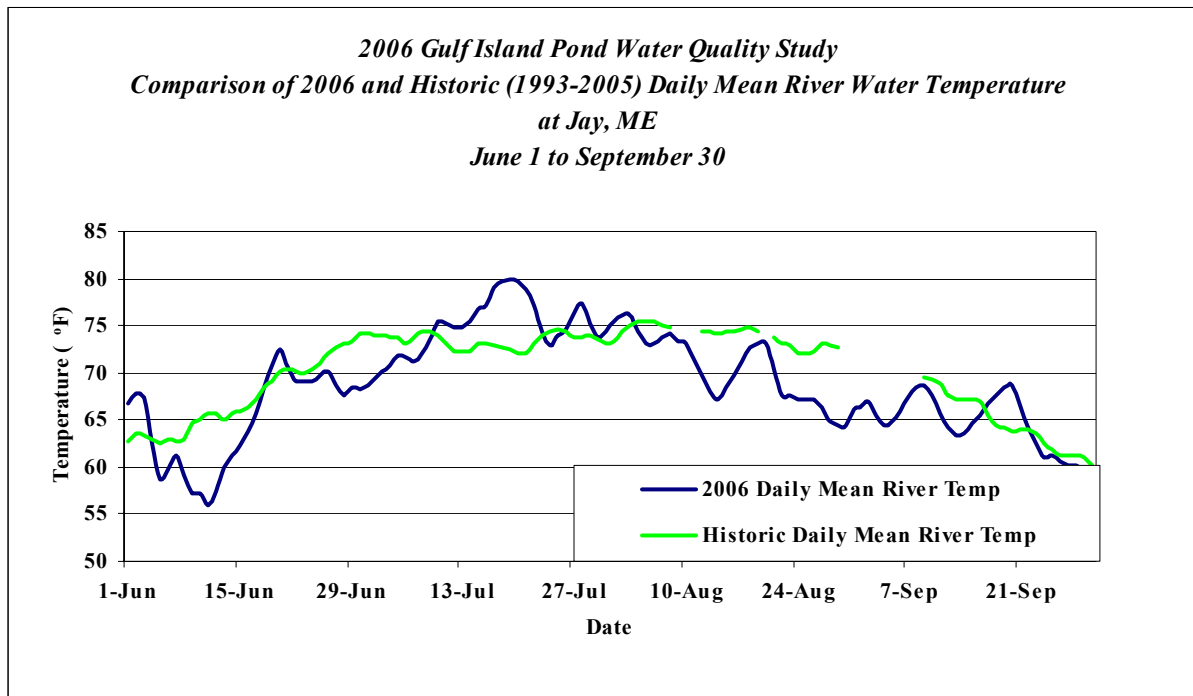
4.1 Ambient Air Temperature

The following chart depicts the daily ambient air temperature in 2006 and the average ambient air temperature from 1971 to 2000 at Augusta, Maine. This data indicates that the ambient air temperature during the summer of 2006 was reasonably consistent with the long-term average.



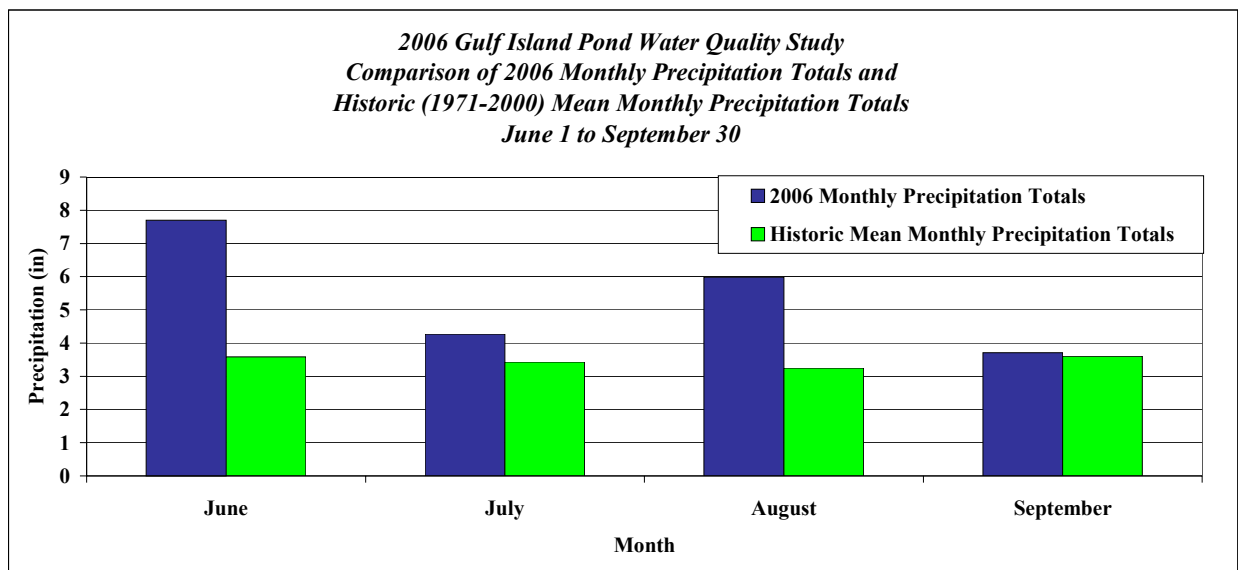
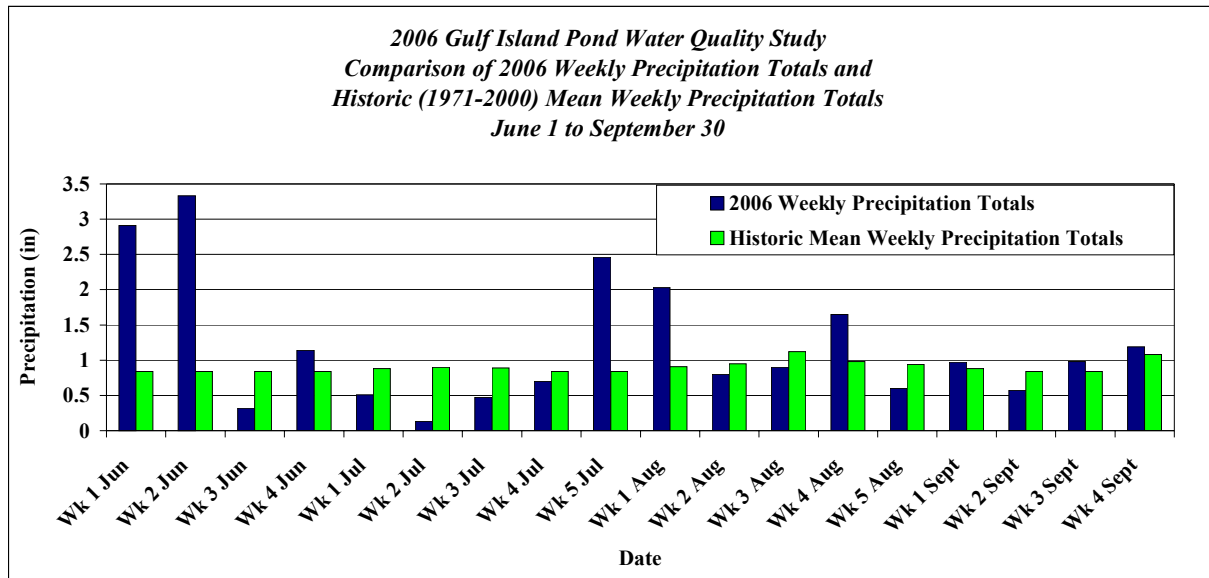
4.2 River Water Temperature

The following chart depicts the daily ambient river water temperature of the Androscoggin River in the summer of 2006 and the average ambient river water temperature from 1993 to 2005 at Jay, Maine. This data indicates that the river water temperatures were generally below average for the entire summer season with the exception of several weeks in July when temperatures were above average.



4.3 Precipitation

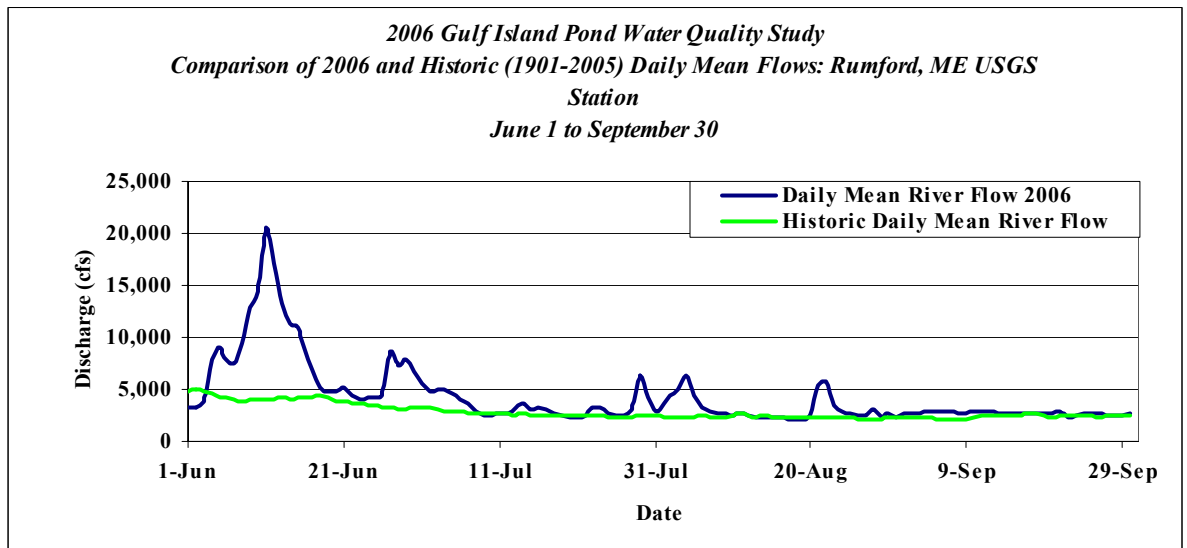
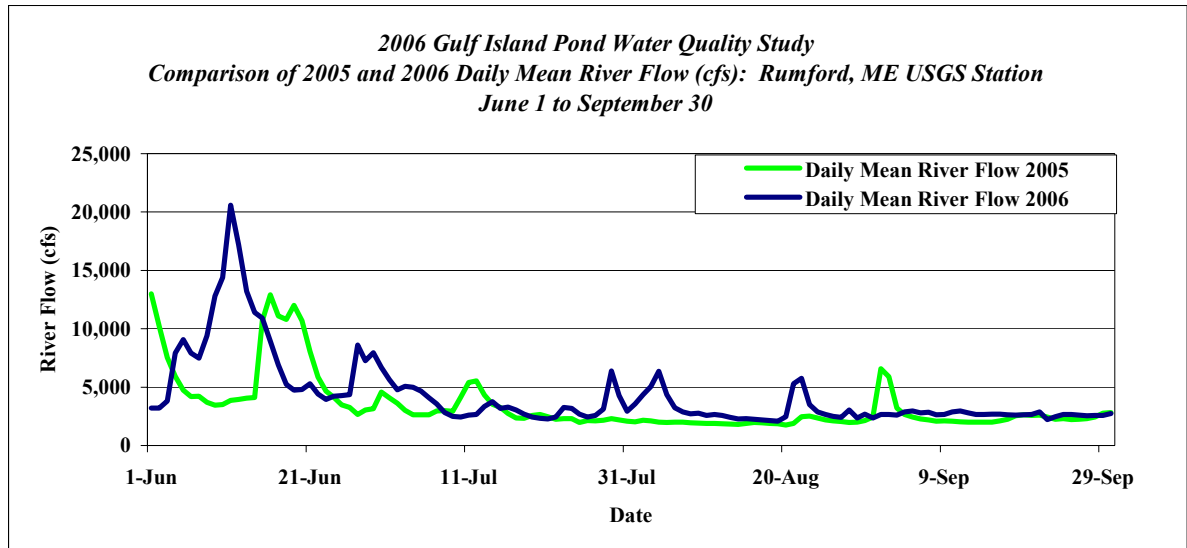
The following two charts depict the weekly and monthly precipitation as measured at the NOAA station in Augusta, ME. The charts include a comparison of the summer of 2006 to the average precipitation from 1971 to 2000.



These charts indicate that precipitation in June was over 2 times the long-term average. Precipitation in July and August were also well above the long-term average. The heavy precipitation in June set the stage for the summer by filling storage reservoirs in the upper Androscoggin River basin and raising ground water levels. The above average precipitation through July and August caused river flows and ground water levels to remain high throughout the summer of 2006.

4.4 Androscoggin River Flows

The following two charts indicate the flow rate of the Androscoggin River at Rumford, Maine in cubic feet per second. The first chart is a comparison of flows during the summers of 2005 and 2006. The second chart is a comparison of 2006 flows to long-term average flows.



These charts of Androscoggin River flow indicate the effects of the abnormally high precipitation in June and continued above average rainfall through July and August. The flow rate in the river was well above average throughout June and continued to be slightly above average through much of July. In early August the flow rate declined to near the long-term average and remained at or near the long-term average for most of August and September, 2006. During the later part of the summer, the flow rates in the river were slightly higher than 2005.

4.5 Phosphorus

The pages that follow contain a series of charts that summarize the results from the laboratory analyses for various types or fractions of phosphorus in samples collected at the six sampling sites from Twin Bridges to Deep Hole on the Androscoggin River and Gulf Island Pond. Standard Methods (1) lists six basic types of phosphorus analyses. They are:

Without Filtration:

- **Total Phosphorus**
- **Total Reactive Phosphorus (aka Total Ortho-phosphorus)**

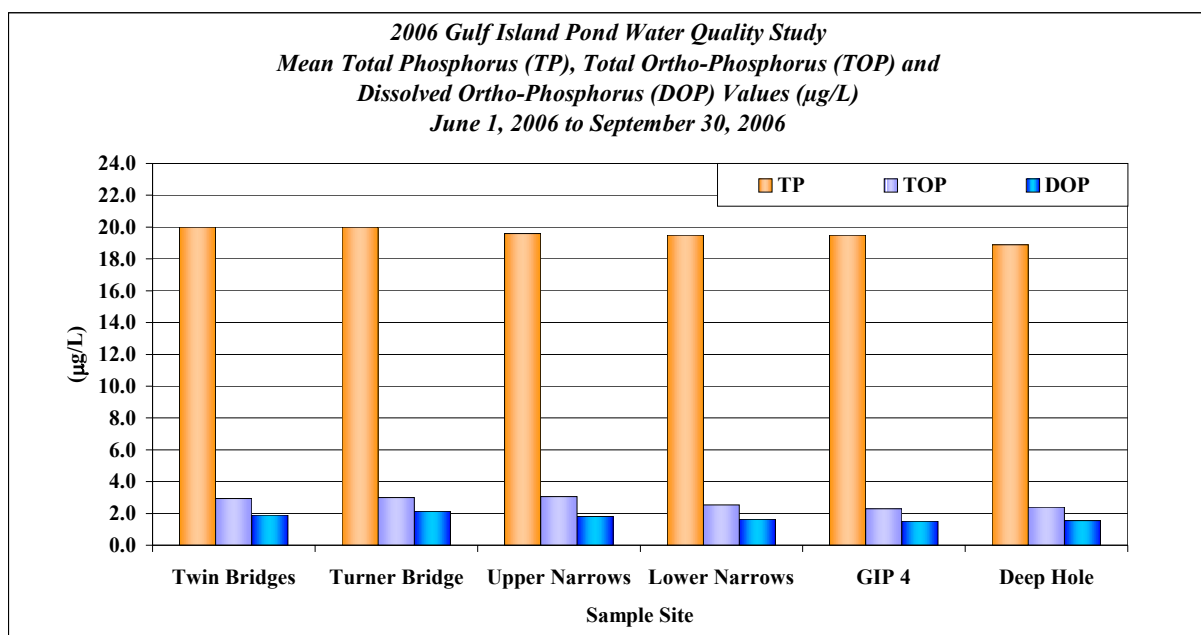
With Filtration:

- Total Dissolved Phosphorus
- **Dissolved Reactive Phosphorus (aka Dissolved Ortho-phosphorus)**

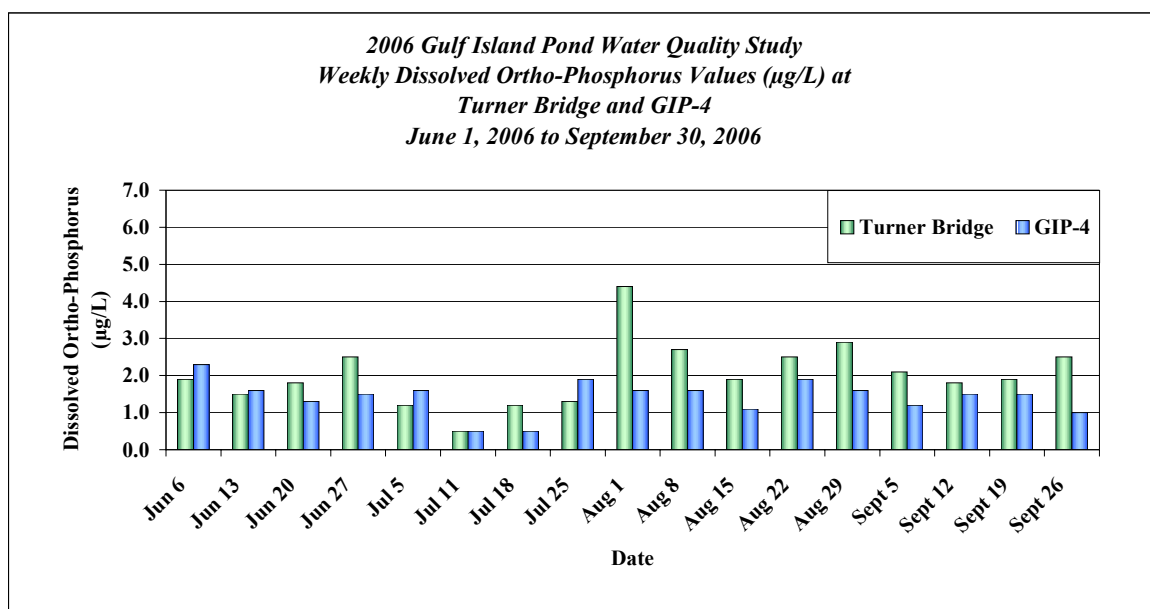
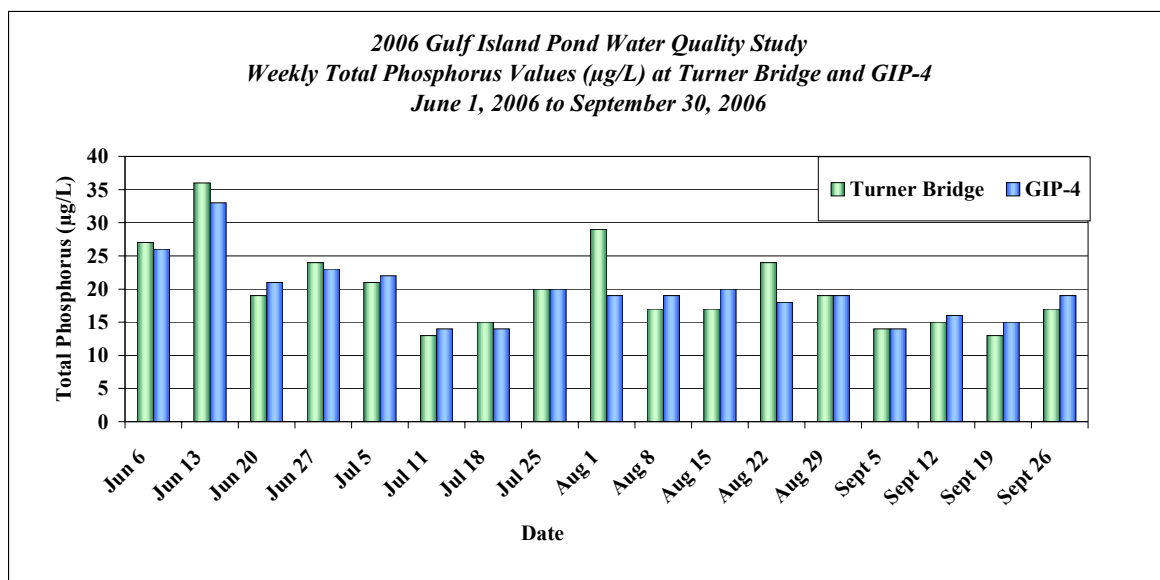
The fractions in bold print are the fractions included in this study.

The first chart in the series depicts the average total phosphorus, average total ortho-phosphorus and average dissolved ortho-phosphorus concentrations at each of the six sampling sites for the summer season of 2006. This chart depicts the variability in the concentration of each phosphorus fraction from the inlet of the Pond (Turner Bridge) to Deep Hole.

It is notable how uniform the total phosphorus and dissolved ortho-phosphorus concentrations were over the length of the pond during the summer of 2006. These data suggest there was very little uptake of the bio-available dissolved ortho-phosphorus as the water passed through the pond. The dissolved ortho-phosphorus test measures the ortho-phosphorus concentration after the algae material has been removed (filtered from the samples).



The default phosphorus concentrations entering the pond listed in Table 3 in the May 2004 TMDL report are 34.6 ppb total phosphorus and 5.5 ppb of dissolved ortho-phosphorus. The goals published in the 2004 TMDL report were achieved during the summer of 2006.

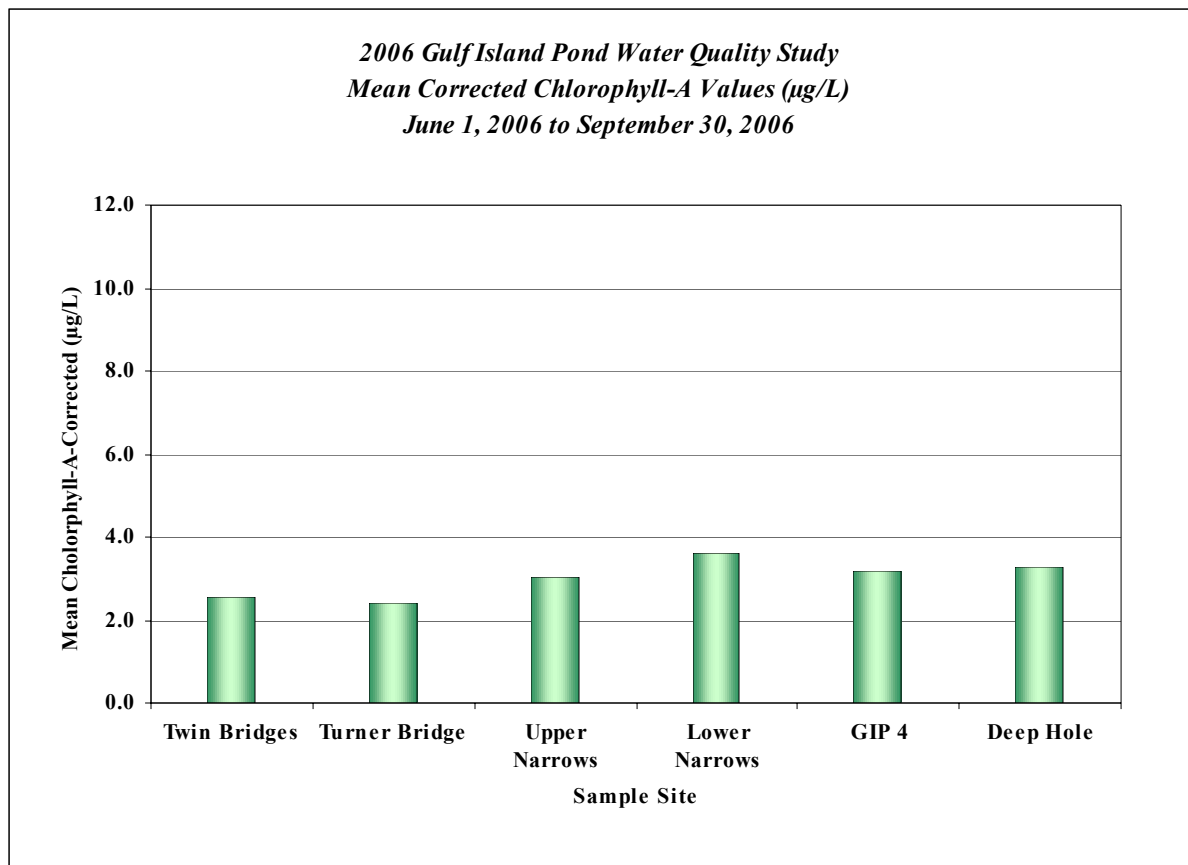


At no time during the 2006 summer season, except for a brief period in mid-July, did the concentration of dissolved ortho-phosphorus drop below 1.5 to 2.1 $\mu\text{g/L}$. These data suggest there is some minimum concentration of the bio-available, dissolved ortho-phosphorus in Gulf Island Pond that is not available to algae to support the photosynthetic process. Another possible explanation for this observation is that some small amount of non-bioavailable ortho-phosphorus is actually passing through the 0.45-micron filter in the dissolved ortho-phosphorus test and is being measured and reported as dissolved ortho-phosphorus when it is actually not dissolved and is therefore not bio-available for plant development in the pond.

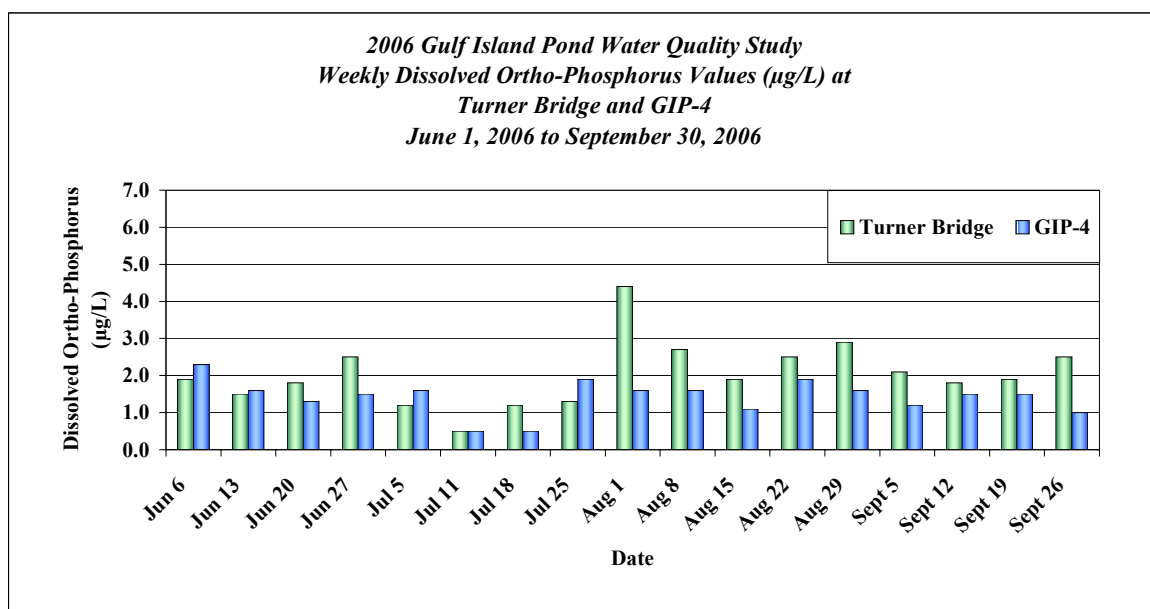
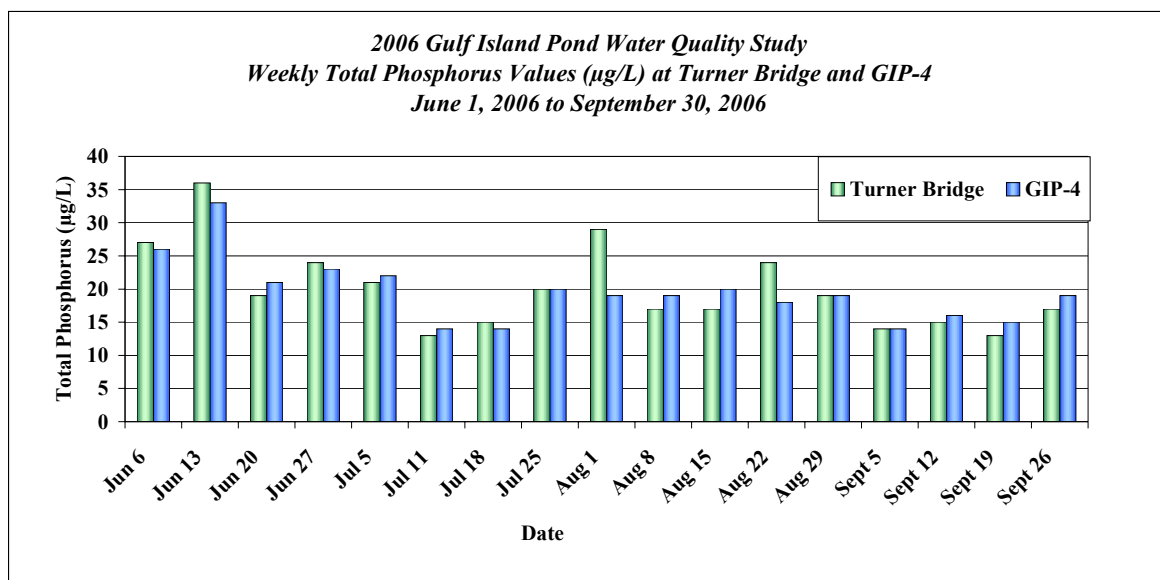
4.6 Chlorophyll-A

The following two charts summarize the results from the laboratory analyses for corrected Chlorophyll-A in samples collected at the six sampling sites from Twin Bridges to the Deep Hole on the Androscoggin River and Gulf Island Pond. The first chart in the series depicts the average corrected Chlorophyll-A concentration at each of the six sampling sites for the entire summer season of 2006. The purpose of this chart is to indicate the variability of the concentration of Chlorophyll-A from the inlet of the Pond to Deep Hole.

The first chart shows that the average corrected Chlorophyll-A concentration entering the Pond was in the range of 2.4 to 2.5 $\mu\text{g/L}$. The average Chlorophyll-A concentration increased slightly to a maximum concentration of 3.6 $\mu\text{g/L}$ at Lower Narrows and remained approximately at that concentration at GIP-4 and Deep Hole.



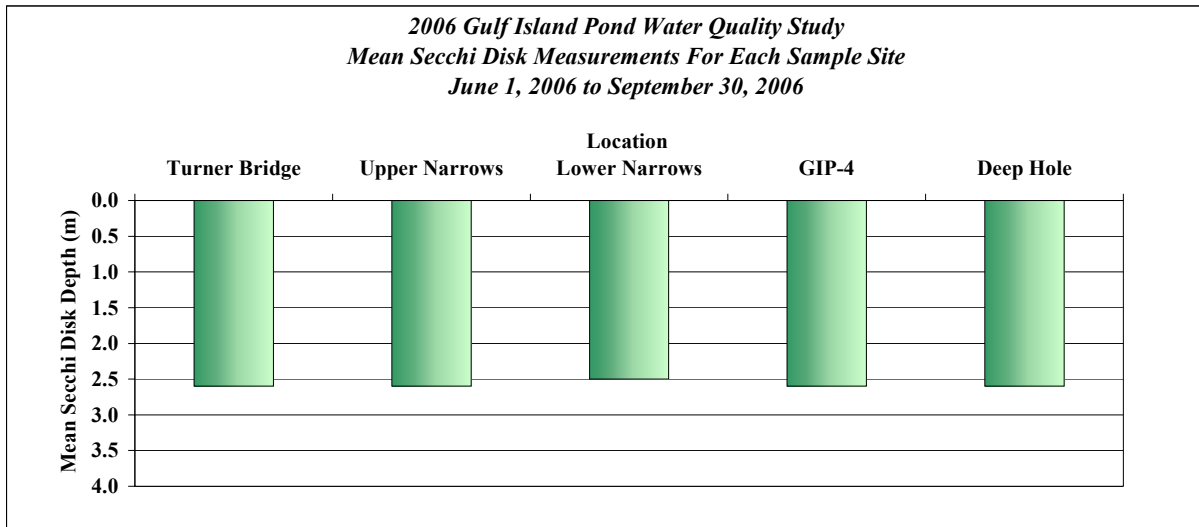
The default phosphorus concentrations entering the pond listed in Table 3 in the May 2004 TMDL report are 34.6 ppb total phosphorus and 5.5 ppb of dissolved ortho-phosphorus. The goals published in the 2004 TMDL report were achieved during the summer of 2006.



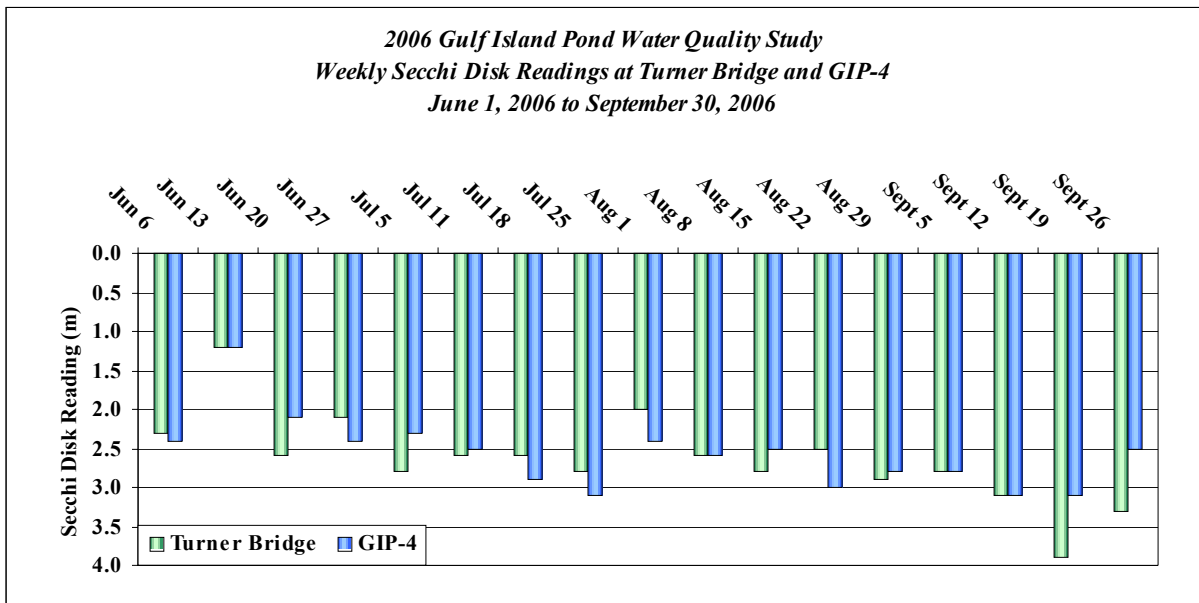
At no time during the 2006 summer season, except for a brief period in mid-July, did the concentration of dissolved ortho-phosphorus drop below 1.5 to 2.1 $\mu\text{g/L}$. These data suggest there is some minimum concentration of the bio-available, dissolved ortho-phosphorus in Gulf Island Pond that is not available to algae to support the photosynthetic process. Another possible explanation for this observation is that some small amount of non-bioavailable ortho-phosphorus is actually passing through the 0.45-micron filter in the dissolved ortho-phosphorus test and is being measured and reported as dissolved ortho-phosphorus when it is actually not dissolved and is therefore not bio-available for plant development in the pond.

4.7 Secchi Disk

The following two charts summarize the results of field measurements for Secchi Disk at the five sampling sites from Turner Bridge to the Deep Hole on Gulf Island Pond. The first chart in the series depicts the average Secchi Disk depth at each of the five sampling sites for the entire summer season of 2006. The purpose of this chart is to indicate the variability of the Secchi Disk depth from the inlet of the Pond at Turner Bridge to Deep Hole.



The second chart depicts the Secchi Disk readings at Turner Bridge and GIP-4 over the entire season. This chart indicates the variability in Secchi Disk readings over the summer.



These data indicate that the mean Secchi Disk reading in Gulf Island Pond was approximately 2.5 meters for the entire summer. The Secchi Disk readings were all greater than 2.0 meters with the exception of the reading on June 13th. The low Secchi Disk reading on this date corresponds with exceptionally high flows caused by exceptionally heavy rains for two weeks preceding this sampling event. There is no indication that the low Secchi Disk reading was caused by algae development in the Pond.

Chapter 581 of Department's rules defines an algae bloom as follows:

***Algal bloom.** - An algal bloom is defined as a planktonic growth of algae which causes Secchi disk transparency to be less than 2.0 meters.*

At no time during the summer of 2006 did Secchi Disk transparency drop below 2.0 meters due to the growth of planktonic algae in the pond. Therefore, based on Chapter 581, there were no algae blooms in Gulf Island Pond in 2006.

4.8 Field Observations

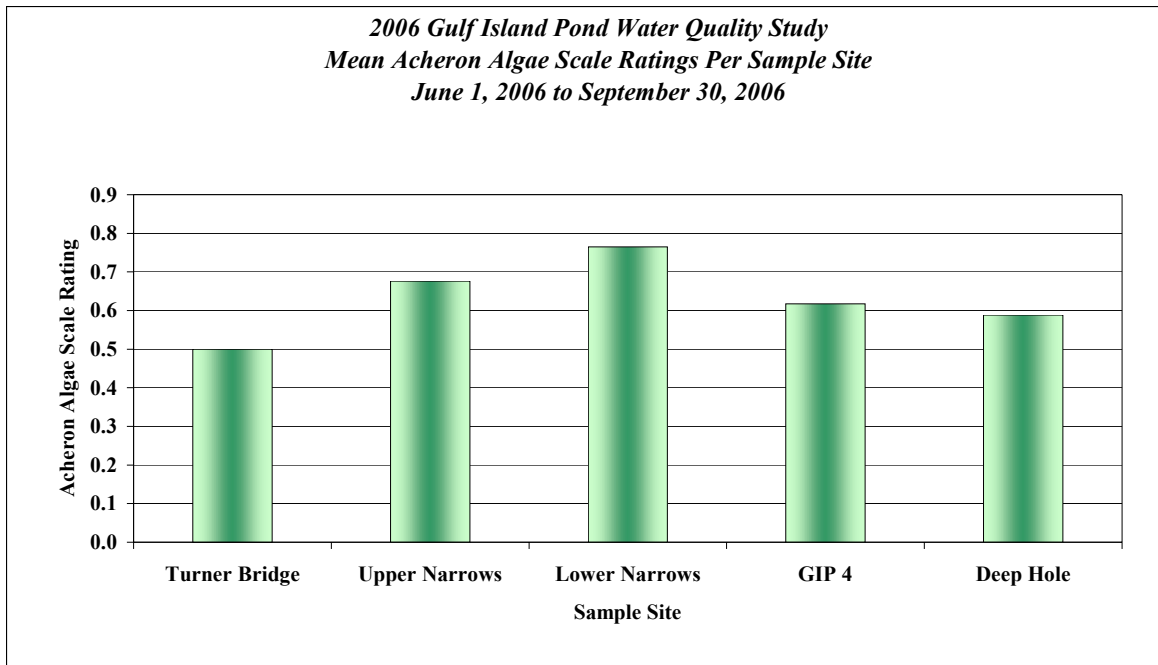
Visual observations of algal density were made at each sample site during each weekly sampling event. Macro observations were conducted during the day as sampling crews traversed the pond between sampling sites. Observers were specifically looking for and recording visual indications of significant algae development on the surface throughout the pond. Micro observations were made at each sampling site using a Secchi Disk viewing scope.

Visual algal observations were recorded based on a numerical rating system referred to herein as the Acheron Visual Algae Scale. The scale has a range from zero (0) to four (4). The following is an explanation of the scale used by Acheron personnel to record the detailed observations at each sampling site.

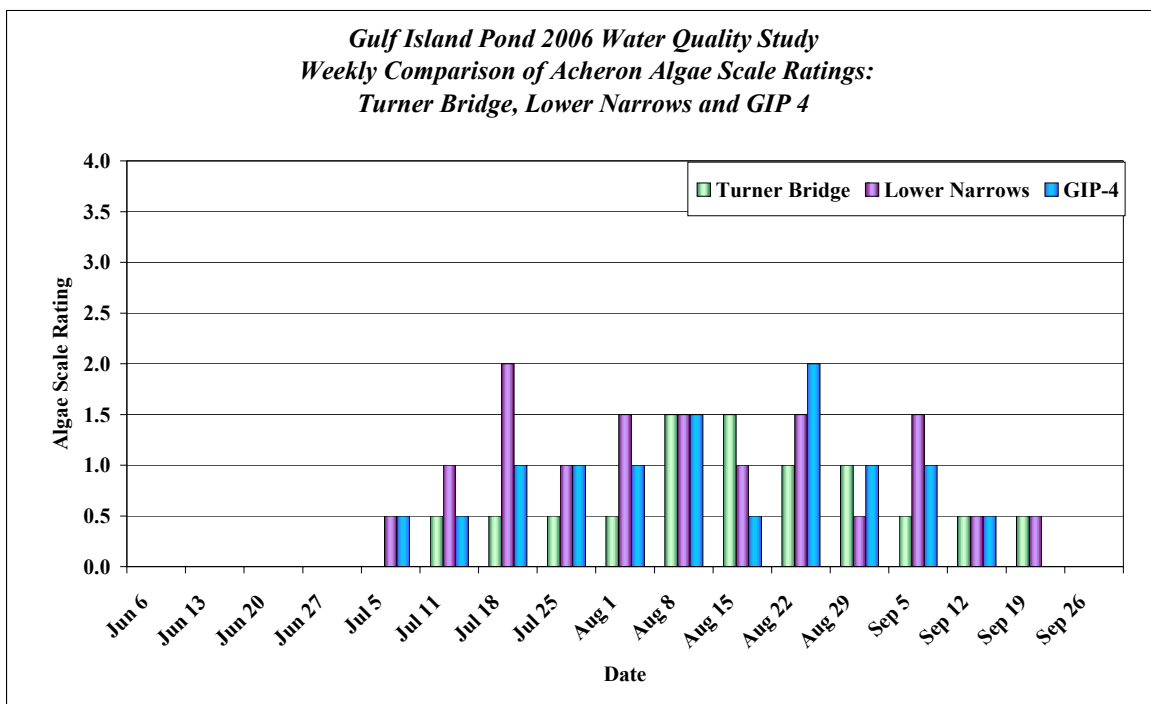
Acheron Visual Algae Scale

- | | |
|---|--|
| 0 | Water visually appears clear. No green tint. No visible algae suspended in the water column. |
| 1 | Water may have a slight green tint. Some suspended algae visible at very low density. |
| 2 | Notable level of visible algae suspended in the water column especially with a viewing scope. Individual algae particles are easily visible but density is low. The water may have a slight green tint. Individual algae particles are well dispersed and do not accumulate in downwind areas. |
| 3 | High concentrations of visible algae suspended in the water column over large areas. Evidence of accumulated algae in downwind coves. This condition is considered to be a visual bloom. |
| 4 | Heavy algae concentration throughout the pond. Large rafts of algae at multiple locations especially in downwind coves. This is considered to be a visual bloom. |

The following charts summarize the results of visual observations of algal density at the five sampling sites from Turner Bridge to Deep Hole on Gulf Island Pond. The first chart in the series depicts the average Acheron Visual Algae Scale values at each of the five sampling sites for the entire summer season of 2006. The purpose of this chart is to depict how the recorded observations varied on from the inlet of the pond at Turner Bridge to the lower pond at Deep Hole.



The second chart compares the weekly visual observations at Turner Bridge, Lower Narrows, and GIP-4. The purpose of this chart is to depict how the recorded observations varied over the duration of the summer.



The data presented above demonstrates that, on average, visible algae values were greatest mid-pond; specifically at Lower Narrows. As a trend over the season, visible algae was

lowest at Turner Bridge; increased through Upper Narrows to a peak at Lower Narrows; then declined through GIP-4 to Deep Hole.

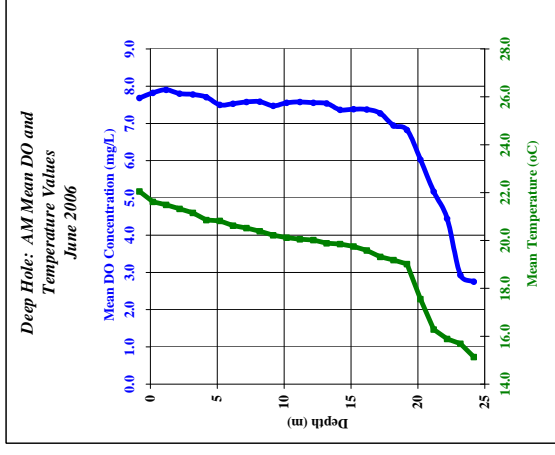
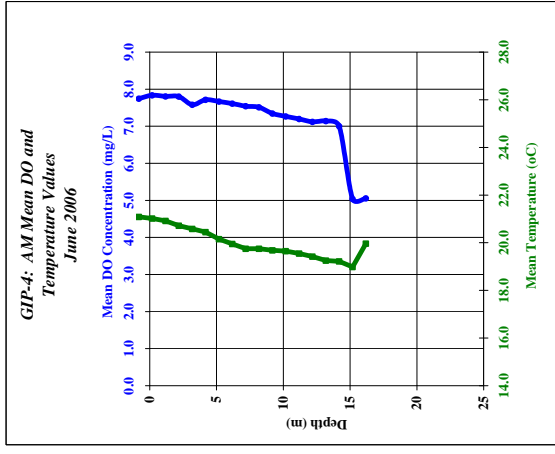
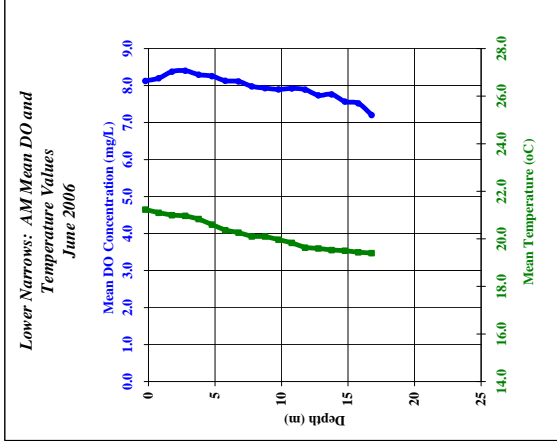
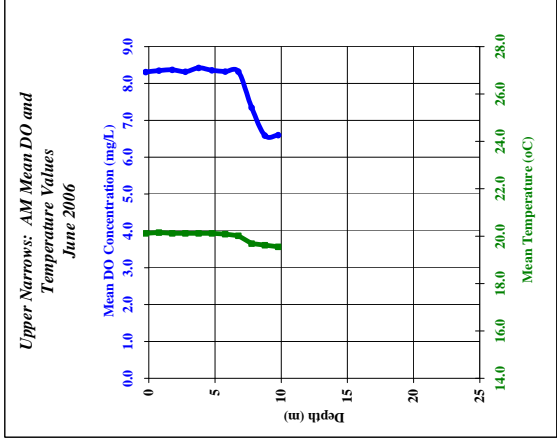
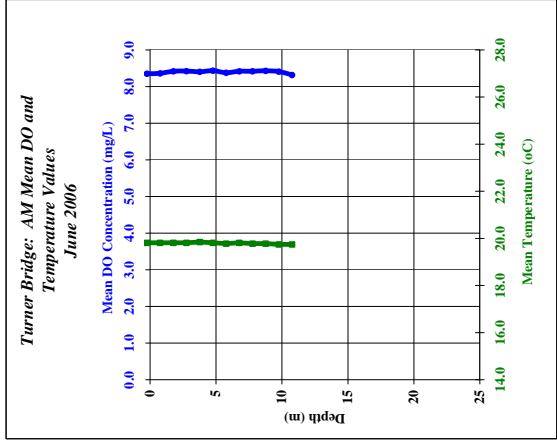
In general, algal development was not noted until early July, when higher-than-average river flows subsided and water temperature increased. Visible algae increased until early August; remained somewhat constant through mid-August, and declined steadily through late August into September.

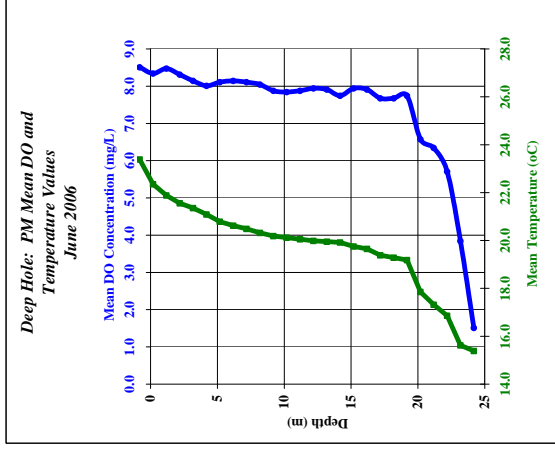
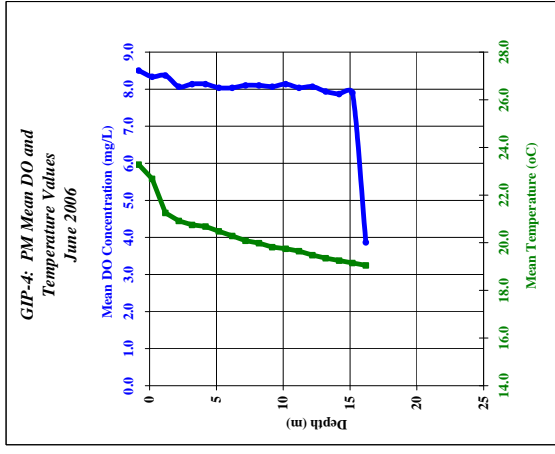
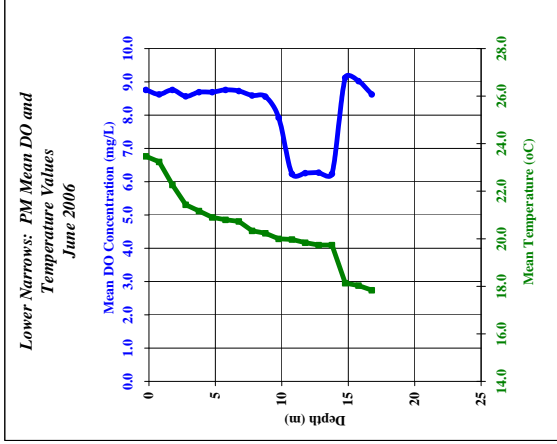
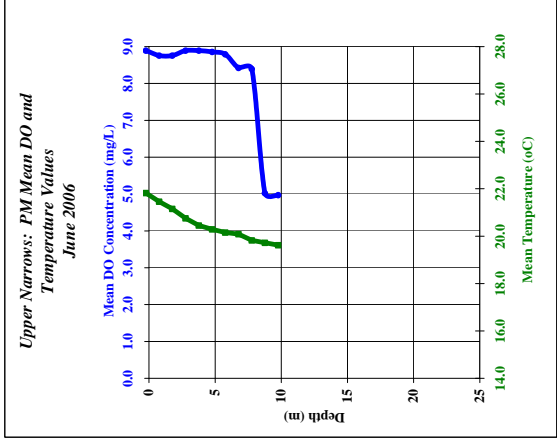
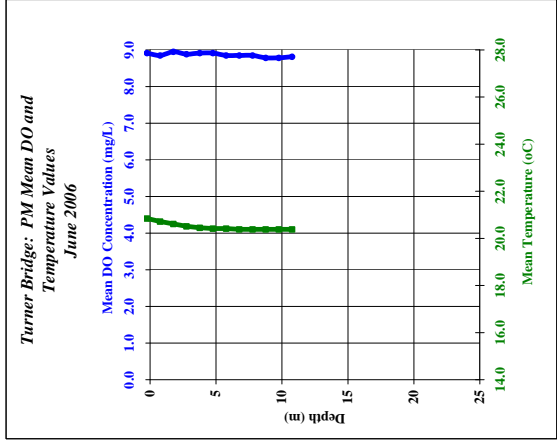
There were no algae blooms observed by Acheron personnel on Gulf Island Pond during the summer of 2006.

There was a report that the Department staff observed a localized bloom on some parts of the pond on Friday, July 28, 2006. There was no indication of bloom conditions on the pond on the regular Tuesday sampling events prior to or following the 28th of July. The visual observations for the days prior to and following are on the charts above. There was a slight drop in Secchi Disk readings for the date of August 1st, which is the first sampling after the localized bloom was observed. There was also a slight increase in chlorophyll-A levels in the lower pond on August 1st. This event was very short in duration and was confined to small sections of the pond.

4.9 Dissolved Oxygen and Temperature

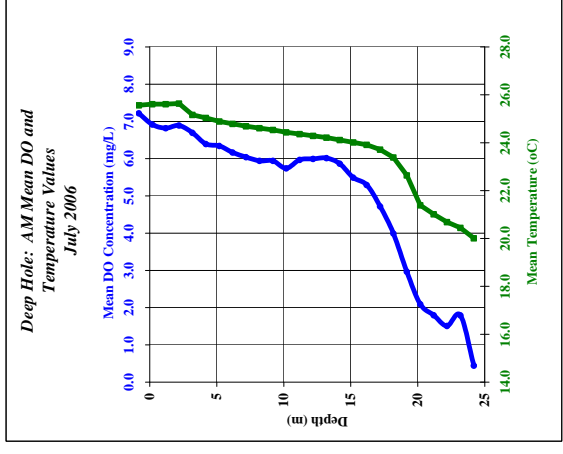
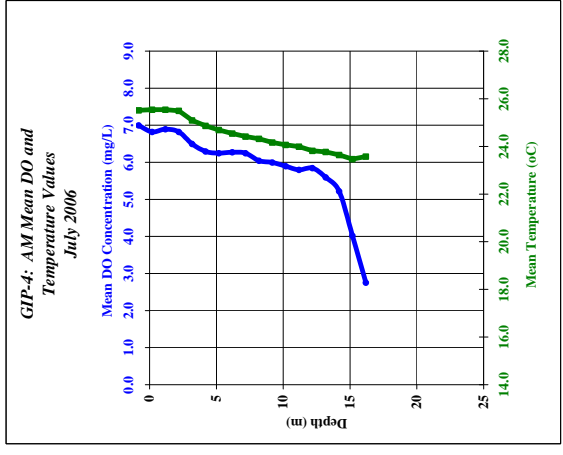
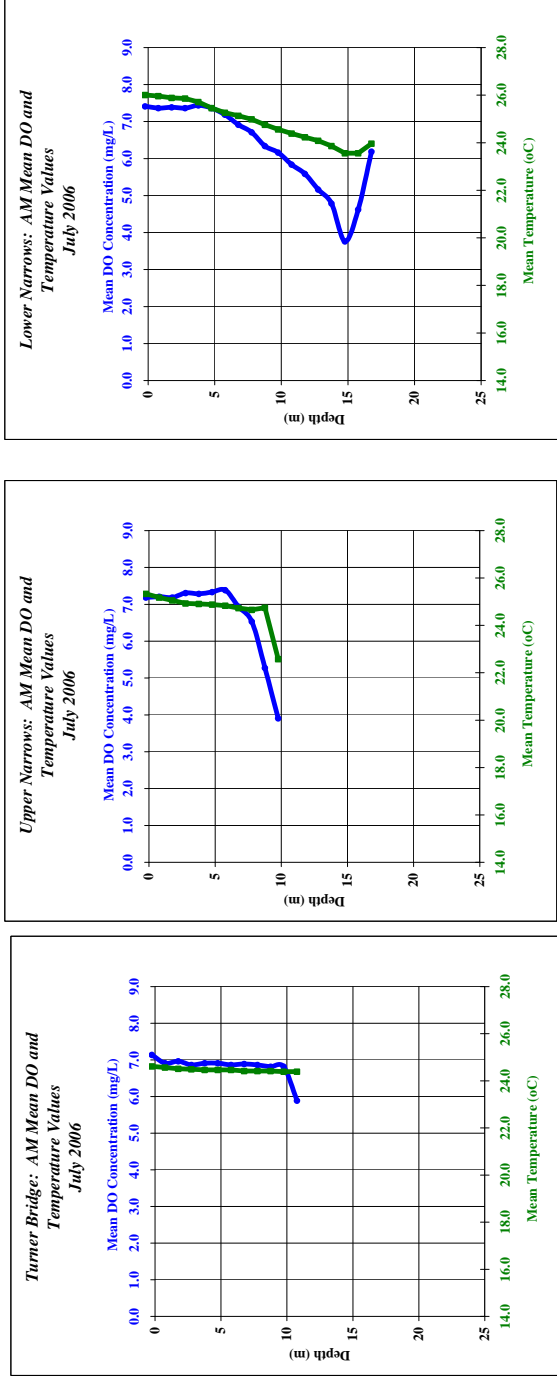
Field measurements of dissolved oxygen concentration and temperature profiles were obtained at five sampling sites in the early morning and afternoon each week from the first week of June to the last week of September. The total data set for the study consists of 170 separate sets of profiles. The data from all profiling is included on the CD included with this report. The following pages include eight separate charts with the mean AM and PM dissolved oxygen and temperature readings for the months of June, July, August and September. This series of charts depicts the trends and variability in the AM and PM dissolved oxygen concentrations in mg/L and the temperatures in degrees Celsius from Turner Bridge to the Deep Hole in Gulf Island Pond throughout the summer of 2006. There is nothing particularly noteworthy about the collected data; and since this is the first year of the monitoring program, these data, collected at these locations and times, cannot be compared to historical data.





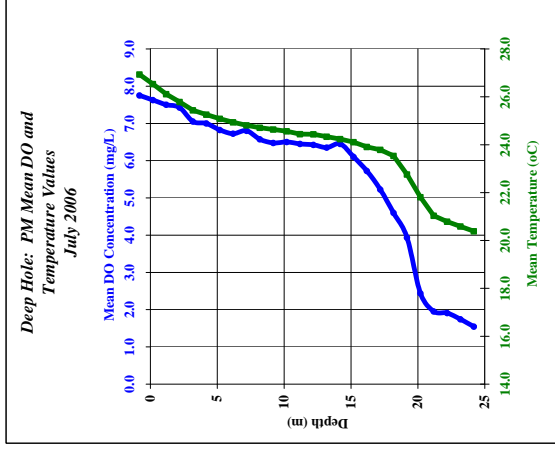
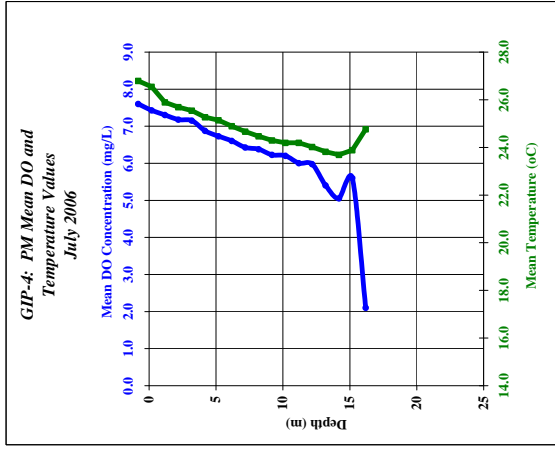
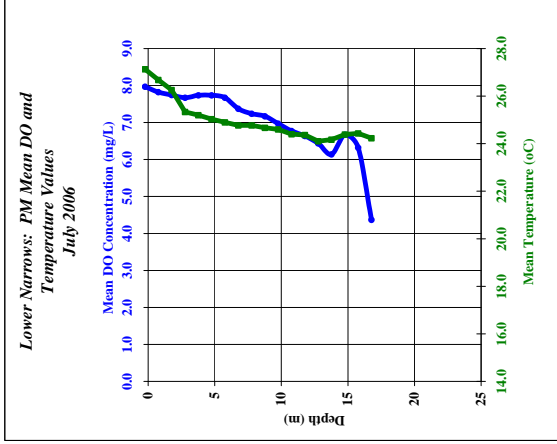
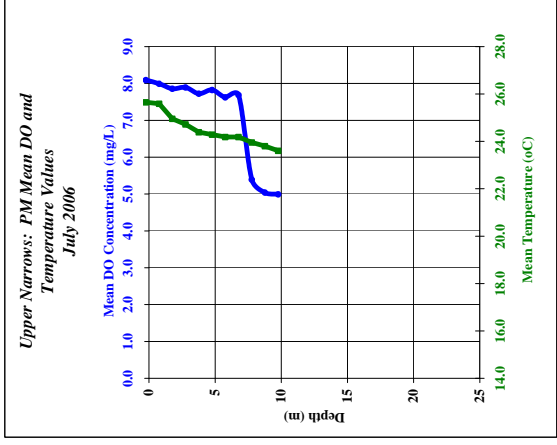
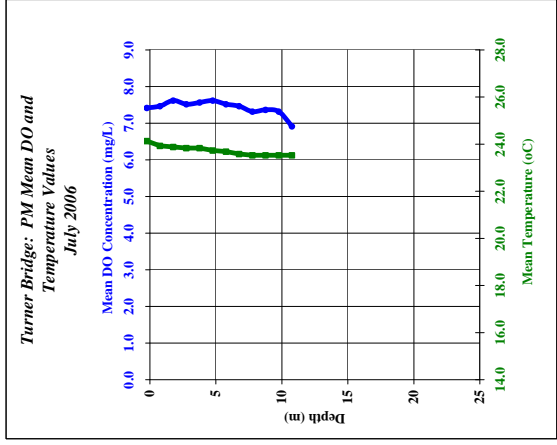
June 2006

PM Mean Dissolved Oxygen and Temperature Values

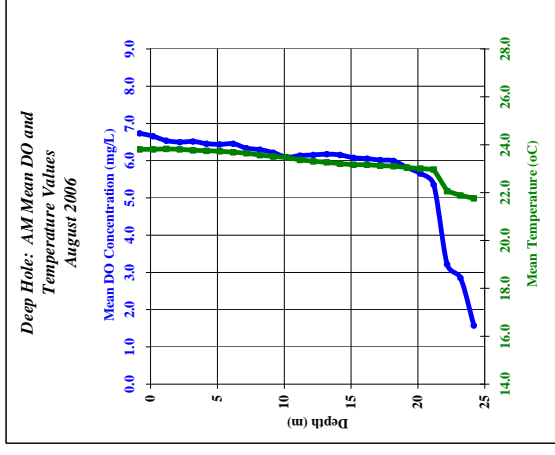
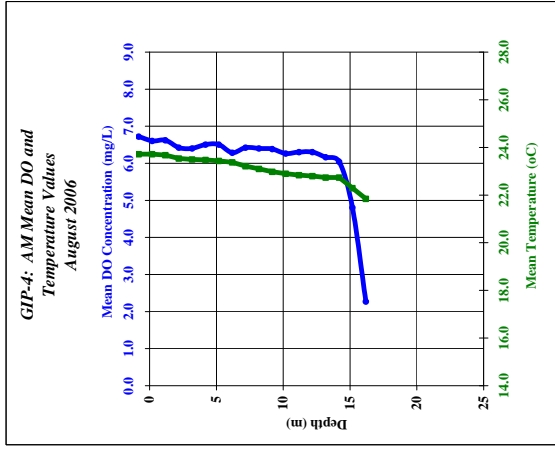
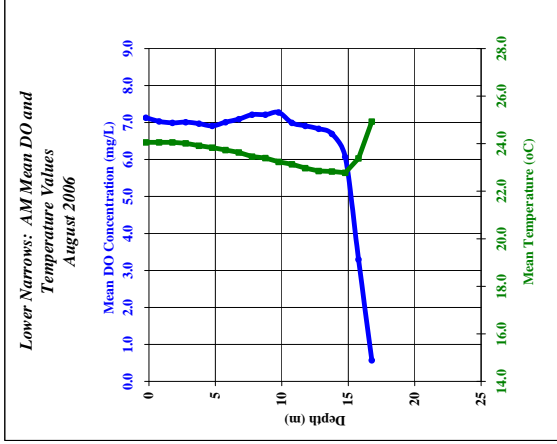
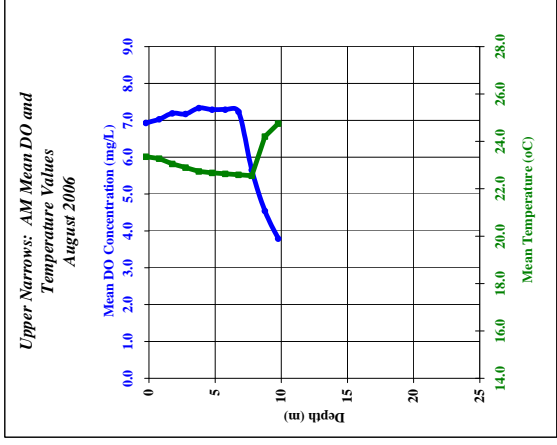
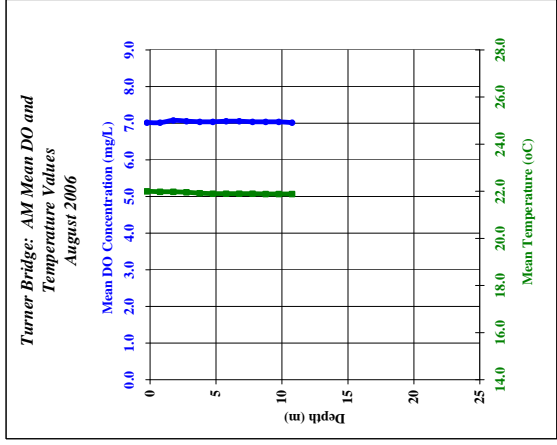


July 2006

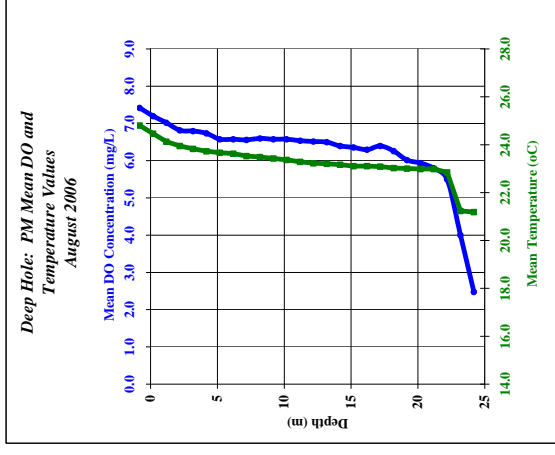
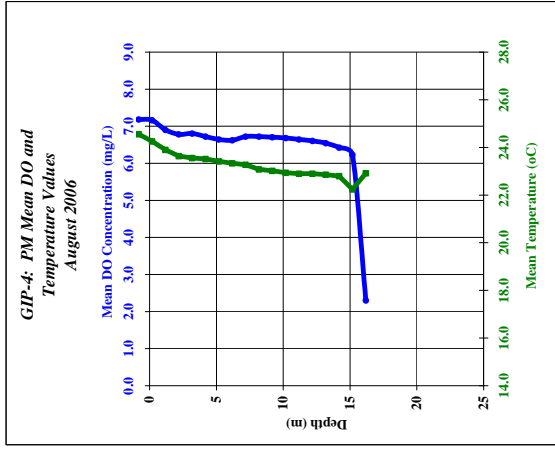
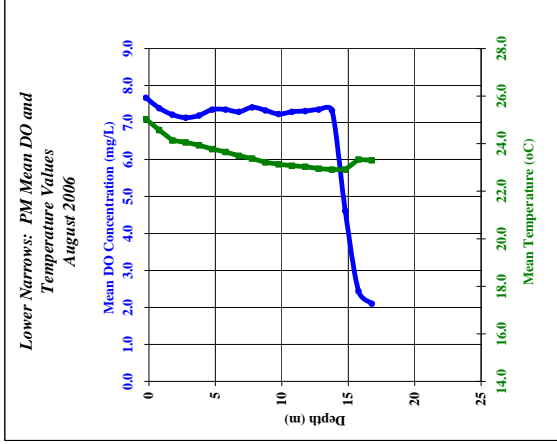
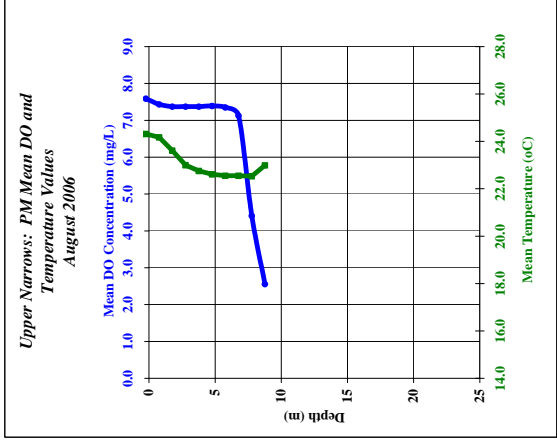
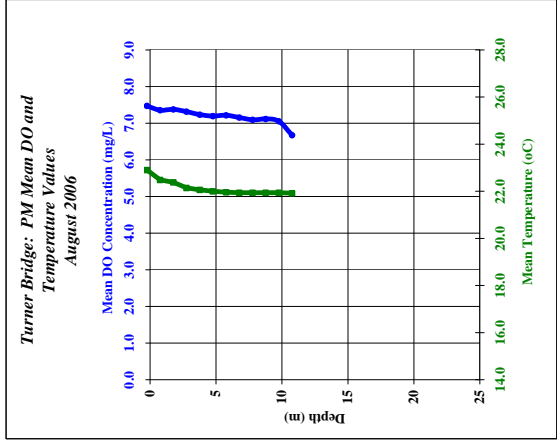
AM Mean Dissolved Oxygen and Temperature Values



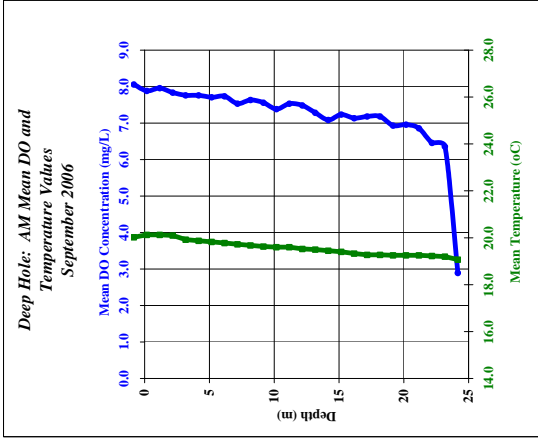
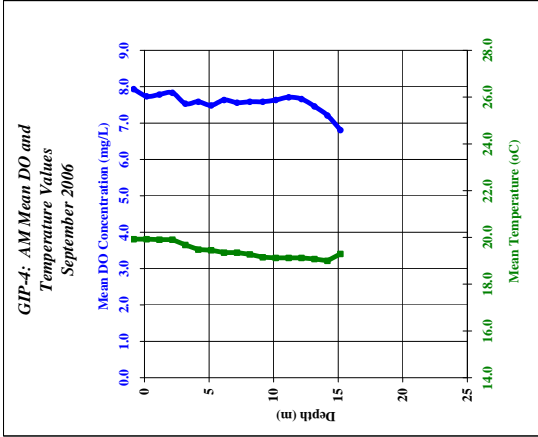
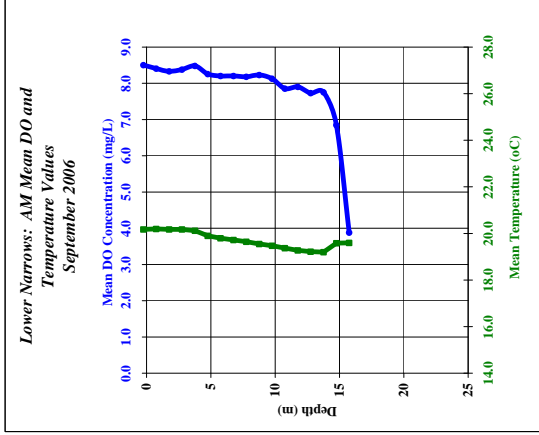
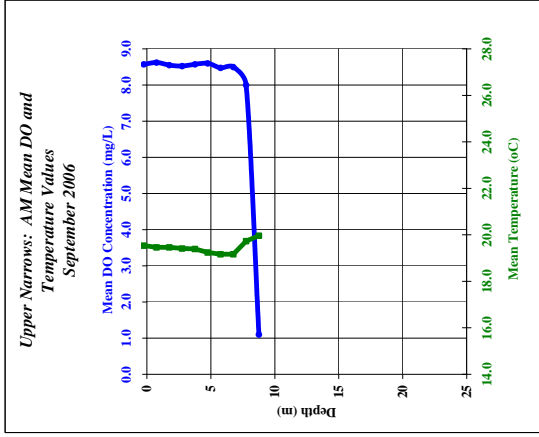
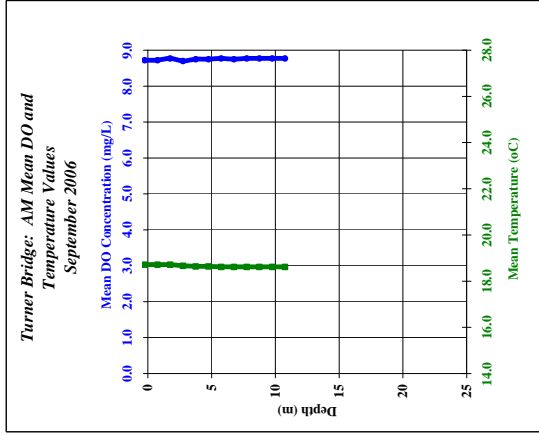
July 2006 PM Mean Dissolved Oxygen and Temperature Values



August 2006
AM Mean Dissolved Oxygen and Temperature Values

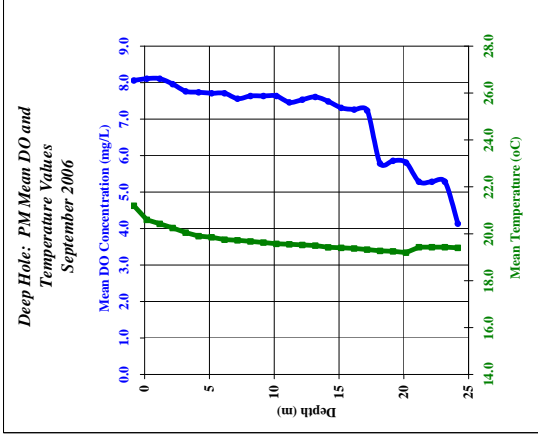
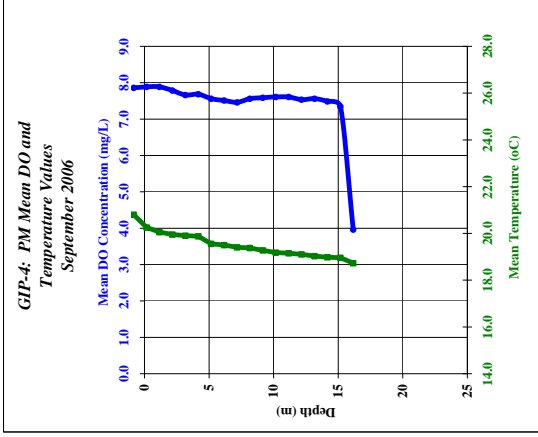
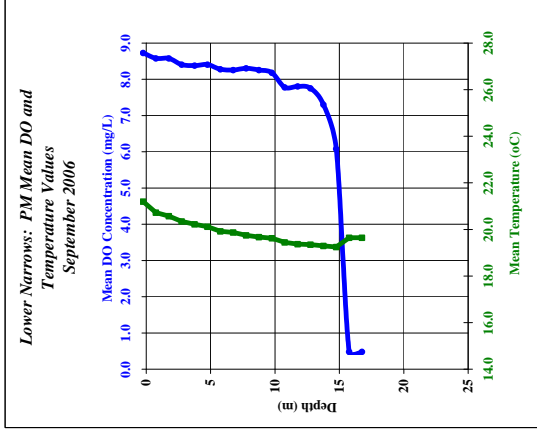
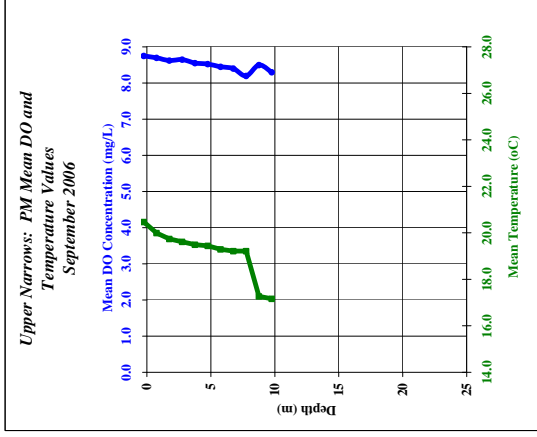
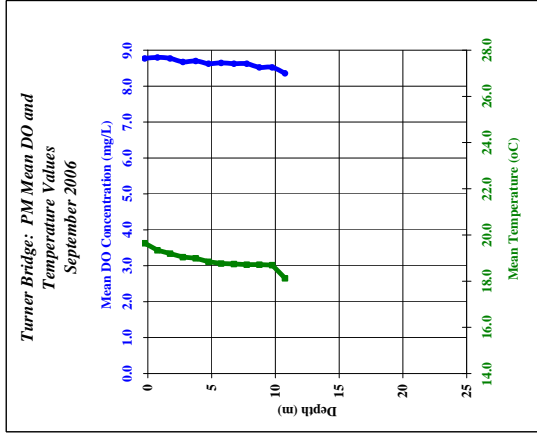


August 2006 PM Mean Dissolved Oxygen and Temperature Values



September 2006

AM Mean Dissolved Oxygen and Temperature Values



September 2006

PM Mean Dissolved Oxygen and Temperature Values

5.0 Conclusions

The following is a summary of the conclusions from the data presented in this report.

- The MEPDES permits issued to NewPage Corporation, Verso Paper and Livermore Falls requires ambient water quality monitoring of Gulf Island Pond from June 1st to September 30th (summer season) and the submission of a report on the monitoring by November 30th.
- In 2006, the ambient water quality monitoring of Gulf Island Pond was conducted in accordance with the work plan approved by the Department without any notable exceptions or anomalies.
- Ambient air temperatures throughout the summer of 2006 were comparable to the long-term average when compared with historical data.
- River water temperatures as measured at Jay, Maine were generally below the long term average for the entire summer with the exception of early July when temperatures were above average.
- Precipitation was well above the long-term average in June and August 2006. During the months of July and September, precipitation was near the long-term average.
- Flow rates in the Androscoggin River (measured in Rumford) were well above the long term average in June and continued to be somewhat above average through the end of July. Flow rates through August and September were at or close to the long-term average.
- Phosphorus:
 - Average total phosphorus concentrations were in the range of 18 to 20 ppb (ug/L) throughout Gulf Island Pond during the summer of 2006. Total phosphorus concentrations varied from a minimum of 13 ppb in mid-July to a maximum of 36 ppb in mid-June.
 - Dissolved ortho-phosphorus concentrations averaged from 1.5 to 2.1 ppb for the summer of 2006 and varied from a minimum of less than 1.0 ppb in July to a maximum of 4.4 ppb for a brief period in early August. These concentrations are substantially below historic levels (see the May, 2004 TMDL report) in Gulf Island Pond.
- Average chlorophyll-A concentrations (corrected) ranged from 2.4 to 3.6 ppb (ug/L) for the summer of 2006. The discrete concentrations ranged from a minimum of 1.2 ppb to 9.2 ppb throughout the summer. The peak concentration of 9.2 ppb was measured at GIP-4 on June 20th. These concentrations are substantially below historic levels (see the May, 2004 TMDL report) in Gulf Island Pond and were substantially below levels that are generally considered to constitute a “bloom”.
- Secchi Disk transparency averaged approximately 2.5 feet for the summer of 2006. In general, Secchi Disk transparency varied from 2 to 3 meters. The lowest reading of 1.2 meters was measured on June 13 following a major storm event and was not caused by algal development. The maximum depth was measured at 3.9 meters on September 19th. Based on the Department’s definition of a “bloom” in Chapter 581 and the measurements recorded during the summer of 2006, there were no algae blooms on Gulf Island Pond in 2006.

- Field observations of algae were documented throughout the summer on days that samples were collected. There were no algae blooms observed by Acheron personnel on Gulf Island Pond during the summer of 2006. The Department reported observing a brief, localized bloom on a small portion of the pond on Friday July 28th.

6.0 Recommendations

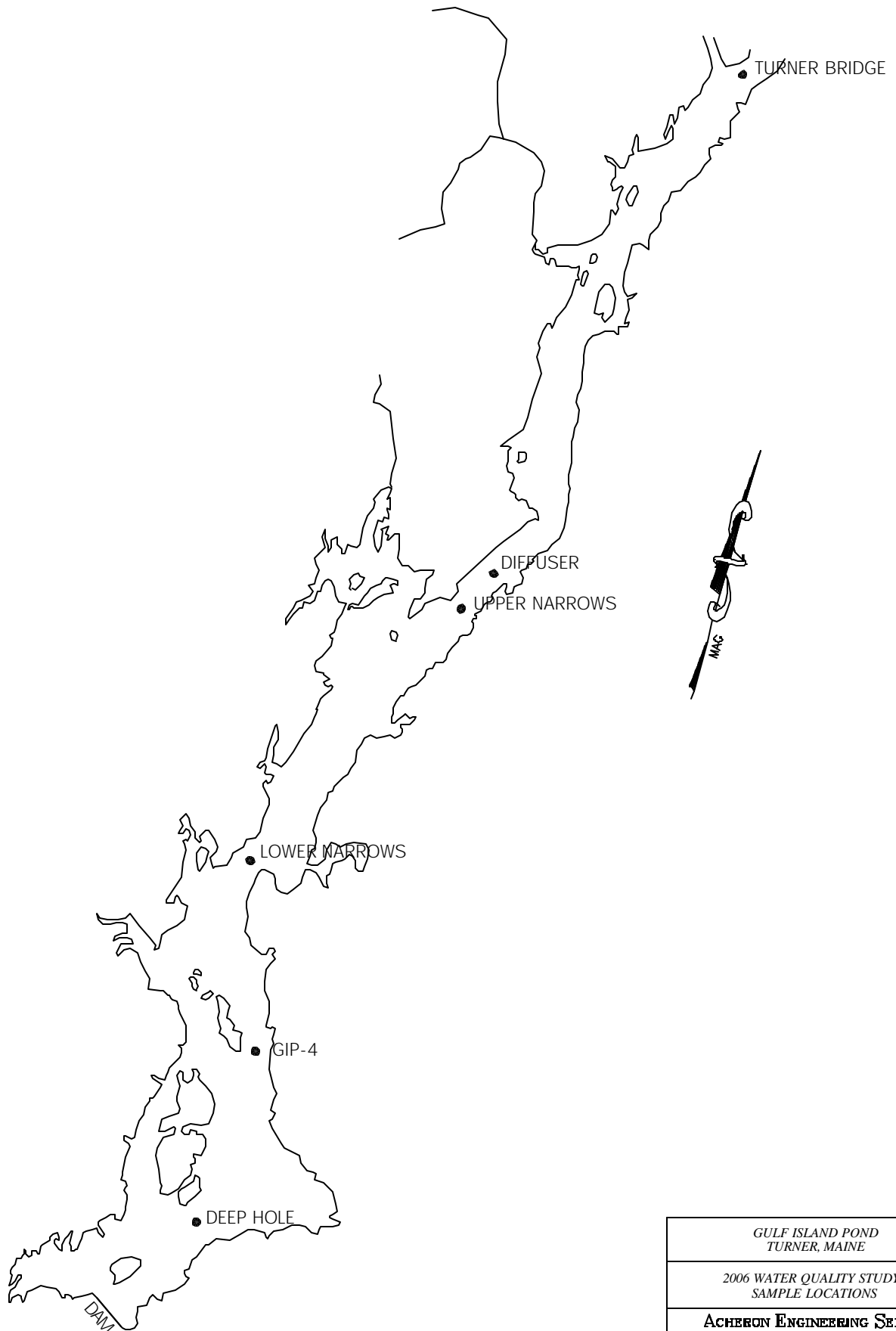
Acheron does not have any recommendations for revisions to the monitoring plan for the coming year.

Respectfully Submitted:
Acheron Inc.

William B. Ball, PE
Maine PE 3069

Seal

Appendix A
Gulf Island Pond 2006 Water Quality Study: Map of Sampling Sites



GULF ISLAND POND
TURNER, MAINE

2006 WATER QUALITY STUDY
SAMPLE LOCATIONS

ACHERON ENGINEERING SERVICES

Engineering, Environmental & Geologic Consultants
207-368-5700 Newport, Maine www.AcheronEngineering.com

DWG NO: A-1756

DATE: 11/21/06

Appendix B
Maine Department of Environmental Protection
Standard Operating Procedure
Dissolved Oxygen and Temperature Measurements



**Bureau Of Land and Water Quality
Division of Environmental Assessment
River Assessment Program
Standard Operating Procedure
Dissolved Oxygen and Temperature
Instantaneous Measurement using Electronic Meters**

1. Applicability – This SOP should be followed for the collection of all data used by DEP for assessing the current state of water quality in river and streams. The data are used for developing water quality models and TMDL's, assessing the attainment status of water quality standards, and support for such programs as hydropower and waste discharge licensing.

2. Purpose – This procedure is used to determine the temperature and dissolved oxygen of rivers and streams as an instantaneous reading using an electronic meter.

3. Definitions

- A. YSI. Yellow Springs International, manufacturer of dissolved oxygen meters commonly used by DEP staff.
- B. Probe. Sensing device located at the end of a cable that is attached to the meter.
- C. Calibration chamber - Small plastic bottle over end of probe or, built in chamber in body of meter designed for probe storage
- D. O ring – Rubber rings that hold the membrane on the end of the probe.
- E. Membrane – A clear, transparent and paper-thin substance similar to cellophane on the end of the probe. The membrane is permeable and allows gases such as oxygen to pass through into probe sensors while at the same time isolating most other undesirable substances.
- F. KCl solution. Potassium Chloride solution used to fill the probe.
- G. Calibration. Set of procedures established by the manufacturer to ensure that the meter is operating properly; a critical quality assurance step in meter preparation prior to use.
- H. Profile. A series of readings taken from the water surface to the bottom usually in one meter depth increments.
- I. Dissolved Oxygen Saturation Table – A table which gives the saturated dissolved oxygen concentrations (PPM) at given temperatures and air pressures
- J. Project Manager – The project manager is a DEP employee who supervises, and has the highest decision making authority. In a DEP river study, an employee in DEA is the project manager. If data is being collected by the regulated community as licensed conditions, the license writer is the project manager.
- K. Team Leader – Team Leaders have the highest authority within a sampling team.

4. Responsibilities

- A. Appointing Team Leaders – It is the responsibility of the project manager to appoint team leaders in a DEP river study. Team leaders are chosen by the project manager based upon known competence, field experience, and familiarity with DEP methods. Team leaders could also be members of the regulated community being required to collect data as licensed conditions. In this situation leaders are not appointed by the DEP.



- B. SOP Use - It is the responsibility of project managers to inform team leaders that this SOP must be used when collecting dissolved oxygen and temperature data with electronic meters for all applicable programs. Team leaders are responsible for assuring that the SOP is used by other team members collecting the data.
- C. Recording of data - It is the responsibility of team leaders to assure that the data is correctly recorded on all sampling sheets.
- D. Data Validation – The project manager has the responsibility of validating data, rejecting data, and making any adjustments to data. If a DEP license writer is project manager, data validation should be delegated to a employee in DEA. In DEP river studies, data sheets should be checked by the project manager at the end of each sampling run, unless this is impractical. For data collected outside the DEP, it is recommended that data initially collected be sent to DEP within 24 hours, if practical, for data validation. By following this recommendation, the undesirable consequence, for example, of having a whole summer's worth of data rejected can be avoided.
- E. Volunteer and Other Monitoring – Data used by the DEP from volunteer monitoring groups or any other monitoring group (example - state or federal agency) collected outside the DEP must follow this SOP. It is the responsibility or the monitoring group to follow this SOP.

5. Guidelines and Procedures

A. Dissolved Oxygen Meter Preparation

- 1. Follow manufacturer's instructions for preparing D.O. meter for use.
- 2. The probe cable should be marked in one-meter increments. If using tape to do this, the tape should periodically be checked to assure the tape hasn't moved or some of the marks are missing.
- 3. Each meter should be equipped with a dissolved oxygen saturation table to assure proper meter calibration. Tables should be photocopied from the latest addition of Standard Methods.
- 4. Each meter should be equipped with the following items so that field repairs can be undertaken as necessary:
 - Extra KCL fluid and membranes for probe.
 - Extra " O " rings for probe.
 - Field record book/card for recording QA and repairs.
 - Scissors for trimming membrane.
 - Screw driver for removing back of meter to replace batteries.
 - Pencil with eraser.
- 5. The meter should be kept as dry as possible. Ideally the meter should be in water-resistant case with closed-cell padding to protect it from damage. Each meter should be equipped with a transparent plastic bag that should be used during rain events. The meter can still be operated within the plastic bag.
- 6. The meter should be turned on before leaving and traveling to the sampling location. If you forget to turn the meter on, keep in mind that the meter should be on for a minimum of 20 minutes before a reliable calibration can be achieved. If practical, also check meter probe (# see 7) at this time.



7. Remove probe from the calibration chamber and make sure the sponge is damp. If sponge is dry, wet the sponge and squeeze excess water. Check the membrane for air bubbles and wrinkles. If bubbles or wrinkles are present, remove membrane, refill with KCL solution and replace membrane (see Instruction Manual). Check to make sure no drops of water are clinging to the membrane and remove if present.
8. The meter should be checked for accuracy initially at the beginning of the sampling season and periodically throughout the summer. Temperature should be compared to a calibrated thermometer, and dissolved oxygen to a wrinkler titration or two other reliable meters. It is especially important to check meters in the lab prior to a large sampling event (i.e. three-day-intensive survey).
9. Replace meter batteries as necessary. Most meters are equipped with a low battery indicator that allow up to 50 hours of additional run time after low battery power is indicated.

B. Dissolved Oxygen Meter Calibration

1. Make sure that all steps necessary for meter preparation (see 5A) are employed.
2. Meter calibration is a necessary step that must be undertaken in all sampling to assure that dissolved oxygen readings are accurate.
3. If possible, the calibration should be undertaken at locations with stable environmental conditions, i.e. air temperature similar to water temperature. A shady area or indoor environment are ideal for this, but not always possible. In situations where the air temperature is more 5°C greater than the water temperature, the probe calibration chamber can be placed in ambient water, being careful not to wet probe in this process. The probe can be wetted prior to calibration to hasten the cooling process.
4. If a barometer is available, use appropriate barometric pressure in the calibration process. If a barometer is not used, assume the appropriate level of oxygen for that temperature at 1 atmosphere (sea level or 760 mm. Hg).
5. Calibrate the meter assigned to your sampling team according to manufacturers instructions (YSI Instruction Manual). The saturated air method is used to calibrate all DEP electronic dissolved oxygen meters. Make sure there are no water droplets on probe membrane. The sponge in the calibration chamber should be damp, but not overly wet. (If sponge is too wet or dry, calibration won't be accurate.)
6. Recheck the calibration to assure temperature and dissolved oxygen readings have remained steady. If readings are not steady re-calibrate meter.
7. Crosscheck meters with other sampling teams (see E1) Re-calibrate if your meter does not agree well with other meters.
8. Calibration should be rechecked at the first sampling location and as necessary thereafter (usually every second or third sampling location). Each meter calibration check should be recorded on field sheet by entering the time of day and meter adjustment (= 0 if no adjustment). In situations when stable environmental conditions cannot be obtained, it is recommended to not calibrate in-between stations, but instead rely on calibrations before and after the sampling run, i.e. meter cross checks.



C. Dissolved Oxygen and Temperature Measurement

1. Meter calibration and proper meter preparation should be undertaken prior to measurement (see 5, a, b)
2. The calibration chamber should be removed just prior to submerging into the water for measurement and replaced after probe is removed from the water after measurement is completed.
3. After a meter has been turned on for use on a particular day, it should be left on until all sampling is completed for that given day.
4. Other relative information such as weather, samplers, meter #, and time of day at each location should be recorded on the sampling sheet in addition to the dissolved oxygen and temperature readings.
5. A desirable location for sampling along the width of a given transect is that location with the most current in shallow depth situations, or the most depth in quiescent situations. Eddies should be avoided as sampling locations.
6. Follow the Instruction Manual for operation of the meter for dissolved oxygen and temperature measurement. The manual explains that water movement of 1 ft/sec is needed across the probe membrane to obtain an accurate measurement of dissolved oxygen. This can be obtained by jiggling of the probe and cable in a vigorous up and down motion. Jiggling is not necessary if sampling in a strong current or if the meter and probe are equipped with a stirrer. (Without water movement, dissolved oxygen readings from the meter would be much lower than the actual dissolved oxygen.)
7. The probe should be submerged long enough at each measurement location until a stable reading occurs. The amount of time necessary for this will vary according to which meter is used (typically 15 seconds or slightly more).
8. If the sampling location has an overall depth of less than a meter, sampling is undertaken at mid depth. In locations exceeding a meter in depth, sampling should be undertaken in one-meter profiles starting at the water surface and ending at the last meter increment above the river bottom. In very deep situations, where it is known from prior experience that readings do not vary significantly vertically, profile increment greater than a meter (2 meters, typically) may be satisfactory.
9. If undertaking profile readings where there is significant depth, care should be employed to assure the cable is being lowered vertically and not scoping. In most situations, if sampling from a boat, anchoring of the boat is necessary to insure vertical measurement. The exception is where there are very strong currents such as tidal estuaries, where drifting is sometimes preferable to anchoring.
10. When sampling in marine waters, salinity corrections must be made to each dissolved oxygen reading. A meter with salinity compensation should be used for this. (If a meter with salinity compensation is not available, the corrections can be made after sampling is completed. This takes considerably more time.) The order for sampling parameters is as follows. Salinity readings are measured first and recorded on the sampling sheets. After recording the temperature on the field sheet, the salinity reading is then duplicated on meter salinity compensation knob. The dissolved oxygen reading can be recorded on the field sheet after switching the mode knob on the meter to this parameter.



D. Sample Location and Timing

1. Location - In river studies, the following factors determine the selection of sampling locations:
 - Maintaining adequate coverage
 - Accessibility
 - Control points (background)
 - Highly impacted locations where low dissolved oxygen is expected (i.e. above dams, below significant point source inputs)
 - Oxygen sources (tributaries, below dams with spillage, below waterfalls, end of long stretch of rapids)
2. Timing – Dissolved oxygen and temperature are usually taken twice per day; in the early AM to capture the lowest daily reading and in mid-afternoon to capture the highest daily reading. If data are to be used for assessing attainment status of dissolved oxygen criteria, at a minimum, the early morning data should be collected. The following guidelines should be followed:
 - The AM data collection should begin at dawn as soon as there is enough light to safely sample. It is preferable to have all data collected before 8 AM. In some situations, this may not be possible. Data collected later than 9 AM may not be useable in attainment assessments.
 - The PM data should begin in early to mid-afternoon with the goal of trying to capture the maximum daily dissolved oxygen and temperature. It is usually not known when this occurs beforehand. As day-length shortens, the time of the maximum becomes earlier. As guideline sampling shouldn't start earlier than 1 PM and should be completed by 5 PM.

E. Quality Control

1. Cross-Checking of Meters - When undertaking multi team sampling efforts, meters of different sampling teams need to be cross-checked to assure consistency of data. All meters are cross-checked with water obtained in a sampling bucket before and after each sampling run. The dissolved oxygen and temperature within the bucket should be similar to ambient conditions that you will be sampling. In most studies, dissolved oxygen and temperature are taken twice a day, which requires three to four meter cross checks per day. The dissolved oxygen and temperature of all meters including the backup meters should be checked and should agree to within 0.3 ppm and 1.5°C, respectively. If agreement cannot be achieved, meters should be re-calibrated and cross-checked again. Meters that can't reach agreement should be discarded until the proper repairs can be made (see troubleshooting, E4). The following procedure should be followed
 - a. Before sampling
 - Calibrate all meters
 - Undertake cross-checks of dissolved oxygen and temperature in bucket
 - Record readings and time on QA sheet
 - Re-calibrate if QA objectives (see above) are not met
 - Cross-check and record readings again



- Use only those meters, which satisfy QA objectives
- b. After completing a sampling run
- Don't calibrate meters prior to cross-check
 - Undertake cross-checks of dissolved oxygen and temperature in bucket
 - Record readings and time on QA sheet*
 - Calibrate if QA objectives (see above) are not met
 - Cross-check and record readings again
- *This information is used to help validate data
2. Meter Requirements – It is preferable for each sampling team to have a backup meter available in the field, which can be employed in the event of failure of the primary meter. In any multi-team sampling effort, a minimum of one backup meter and three total meters are needed for any sampling effort. In a single team sampling effort, at least one backup (meter or Wrinkler) is needed to assure proper QC.
 3. Suspect Readings – Dissolved oxygen or temperature readings that look unusual or are much different from other readings should be re-checked. When doing a profile, readings could be re-checked as you are raising the probe to the water surface. In a wide river, readings should be repeated in a different location along the transect to assure the location that you chose is typical of that given transect. The backup meter should also be used to verify unusual readings.
 4. Duplicate sample stations are selected randomly in river studies. Coverage rates are typically 10%. In duplicate sampling, everything is repeated as an independent event. In a profile, all dissolved oxygen and temperature readings are repeated. Agreement should be to within the meter cross-check specifications (see D-1)
 5. Meters should periodically be checked in the laboratory for accuracy (see A-8) Following the protocols for meter preparation and care should result in minimal operational problems.
 6. Data validation – The following is used as guidelines:
 - A. Data Validated – Dissolved Oxygen, temperature, and salinity all meet QA objectives
 - B. Data Validated with Adjustments – Parameters fall outside QA objectives but still within 10% of objectives.
 - Temperature – Determine if error is consistent (ie. 1°C) or inconsistent (varies with temperature). Apply correction to temperature directly with the former and with a correction curve with the latter. Calibrate DO based upon corrected temperature. Temperature could be corrected after the fact but it should be noted on sample sheet if recorded temperature is corrected or uncorrected.
 - Salinity- Apply corrected salinity to dissolved oxygen meter compensation knob.
 - Dissolved oxygen – If correction results from temperature or salinity adjustments, determine the difference this makes in the saturated dissolved oxygen reading. The correction is the product of this reading and the dissolved oxygen % saturation. If the dissolved oxygen reading of a sampling team fails to comply with QA objectives at the end of the sampling run before calibration, a straight line correction is normally made to their data, using the QA check information obtained at the beginning and end of the run.



C. Data Rejected – If any of the parameters are greater than 10% outside of QA objectives, the data for that particular parameter must be rejected. The data for the other two parameters may be acceptable, as long as any adjustments do not violate the 10% criteria.

F. Dissolved Oxygen Meter Care

1. Proper meter care is essential for accurate measurements.
2. Meters should be kept as dry as possible when being used in the field. When sampling is completed for a given day, the meter should be stored indoors in a dry place. The lid to the meter box should be opened during initial storage to facilitate drying. If very wet, remove meter and contents from storage box to facilitate drying.
3. The probe should be kept within the calibration chamber whenever it is not submerged in water for measurement to prevent excessive drying of the probe membrane.
4. Both the meter and the probe are very sensitive to shock. Avoid hitting the probe against such items as rocks, bridge abutments, the side of the boat, or the river bottom if in a cobble or rocky substrate. It is preferable to transport the meter within the cab of a truck rather than in the back of the truck where it can slide and be banged around and damaged.
5. Troubleshooting - If the meter does not calibrate or its readings do not satisfy QC objectives, the following measures should be taken.
 - a. Membrane – A faulty membrane is usually the problem. Change the membrane using directions in Instruction manual. The life of a membrane depends upon usage and sampling conditions, but 2 to 4 weeks is average.
 - b. KCL Solution - If changing the membrane doesn't fix the problem, empty KCL solution within probe, flush out probe with distilled water, and replace with new KCL solution in addition to replacing the membrane. See Instruction Manual explaining how to replace fluid.
 - c. Probe – The problem could be a faulty probe. Before replacing the probe, try swapping the probe of the faulty meter with the probe from a meter known to be in good working order. If this fixes the problem, the probe needs to be replaced. If not, then the probe is not the problem.
 - d. Batteries / Corrosion – The batteries and their connections could be checked for corrosion. Replace batteries and clean any corrosion and recheck. Similarly all connections in probe and meter to cable should be checked for corrosion. Corrosion is a common problem if the meter is being used frequently in salt-water environments.
 - e. Operating knobs – Corrosion here can also create problems. If you don't feel comfortable disassembling the electronic components of the knobs, send the meter out for repair.
 - f. Repair – If all else fails, send the meter out to repair ASAP. Don't forget to notify others who may be using the meter, that it will be unavailable.
6. Winterizing – After you know use of the meter is completed for the field season, the following steps should be taken for long term storage.
 - Completely dry meter and case and all items in the case before storing.



Standard Operating Procedure
Bureau of Land and Water Quality
Date: Dec 13, 2002
Doc num: DEPLW2002-??

- Remove batteries.
- Remove membrane and "O" ring.
- Remove KCL fluid including pumping diaphragm.
- Rinse entire probe chamber with distilled water.
- Cover top of probe with membrane to keep dust and dirt out for winter.
- Keep meter dry and in a heated storage place to prevent corrosion of
- electronic parts.
- Record winterization date and equipment repairs in Equipment Log.
- Label the meter and case as 'WINTERIZED' in an obvious manner (so
- users will know the current status of the unit).

Now's the time to send the meter for repair if there are known pending problems, rather than waiting to do this during next year's field season.

Appendix C
Laboratory QA-QC Documents



State of Maine
Department of Health & Human Services
12 State House Station
Augusta, Maine
04333-0012

John Elias Baldacci
Governor

John R. Nicholas
Commissioner

Laboratory ID: ME0030 Date of Issue: 1/19/2005 Expiration Date: 2/1/2006
Acheron Inc. dba ClearWater Laboratory (207) 368-5786
153 Main Street Newport ME 04953

Has demonstrated the capability to analyze WASTEWATER analytes as defined by the National Pollution Discharge Elimination System and as required by 22 M.R.S.A., Chapter 157-A and the rules for Comprehensive Environmental Laboratory Certification and is hereby granted CERTIFICATION FOR:

E. Coli	SM 9213 D	Full Certification
Fecal Coliform - MF Technique	SM 9222 D	Full Certification
Specific Conductance	EPA 120.1	Full Certification
pH	EPA 150.1	Full Certification
Residue, Filterable (TDS)	EPA 160.1	Full Certification
Residue, Non-Filterable (TSS)	EPA 180.2	Full Certification
Residue, Total (TS)	EPA 180.3	Full Certification
Residue, Settleable	EPA 180.5	Full Certification
Alkalinity	EPA 310.1	Full Certification
Chlorine, Total Residual	EPA 330.5	Full Certification
Nitrogen, Ammonia	EPA 350.2	Full Certification
Nitrogen, Nitrate	EPA 352.1	Full Certification
Nitrogen, Nitrite	EPA 354.1	Full Certification
Orthophosphate	EPA 365.2	Full Certification
Phosphorus, Total	EPA 365.2	Full Certification
Sulfide	EPA 376.2	Full Certification
Biochemical Oxygen Demand	EPA 405.1	Full Certification
Chemical Oxygen Demand	EPA 410.4	Full Certification
Phenolics, Total	EPA 420.1	Full Certification
Hardness, Total by Calculation	SM 2340 B / SM 3111 B	Full Certification
Chloride	SM 4500 (Cl-) B	Full Certification
Cadmium	SM 3111 B	Full Certification
Calcium	SM 3111 B	Full Certification
Copper	SM 3111 B	Full Certification
Iron	SM 3111 B	Full Certification
Lead	SM 3111 B	Full Certification
Magnesium	SM 3111 B	Full Certification
Manganese	SM 3111 B	Full Certification
Sodium	SM 3111 B	Full Certification
Zinc	SM 3111 B	Full Certification
Aluminum	SM 3113 B	Full Certification
Arsenic	SM 3113 B	Full Certification
Chromium	SM 3113 B	Full Certification
Nickel	SM 3113 B	Full Certification
Silver	SM 3113 B	Full Certification

This Certificate supercedes all previously issued certificates.


Matthew J. Sica, Certification Officer

DISPLAY IN A PROMINENT POSITION

**CWA - Non-Potable Water
Performance Evaluation Report
NSI Laboratory Proficiency Testing Program
Study WP-103 - Shipped: 06/03/2005 - Closed: 07/18/2005
USEPA Labcode: ME00030**

AUG 10 2005

7517 Precision Drive, Suite 101, Raleigh, NC 27617
NVLAP Code: 200440-0

This evaluation report is being submitted to:

Clearwater Laboratory
Attention: Marc Hein
153 Main Street
Newport, ME, 04953

LabCode and Accreditation Information:

Send Results to: State and EPA

EPA Lab Code: ME00030

State Lab Code:

Agency: ME Department of Human Services

Attention: Mr. Matthew J. Sica

Address: 11 State House Station

City/State/Zip: Augusta, ME 04333-0011

Reports to: ME

Participant Information

NSI Lab Code: N00190

This report was submitted by Marc H. Hein, Laboratory Manager.

Clearwater Laboratory
153 Main Street
Newport, ME, 04953

207-368-5786

Please contact Mark Hammersla at NSI if you have any questions about this report.
(800) 234-7837 - Mark.Hammersla@NSI-ES.com

This PT report may contain data not covered under NVLAP Accreditation.

PEI-026 Demand - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
38 BOD	n/a	n/a	USEPA 405.1	57.4	56.4	mg/L	37.7 to 75.1	28.3 to 84.4	ACCEPT.	7/11/05
36 COD	n/a	n/a	USEPA 410.4	86.0	91.0	mg/L	73.6 to 101	66.9 to 107	ACCEPT.	7/12/05
37 TOC	-- Not Reported --									
102 CBOD	-- Not Reported --									

PEI-027 Minerals - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
23 Calcium	n/a	n/a	SM3111B	30.0	30.1	mg/L	28.0 to 33.0	26.7 to 34.3	ACCEPT.	6/28/05
28 Chloride	n/a	n/a	SM4500(CL- B)	134.0	131	mg/L	119 to 143	113 to 149	ACCEPT.	7/18/05
24 Magnesium	n/a	n/a	SM3111B	26.0	25.7	mg/L	23.3 to 28.3	22.0 to 29.5	ACCEPT.	6/30/05
25 Sodium	n/a	n/a	SM3111B	74.5	76.8	mg/L	69.0 to 84.2	65.2 to 88.0	ACCEPT.	6/28/05
20 Specific Conductance (at 25C)	n/a	n/a	EPA 120.1	782.0	772	umhos/cm	725 to 820	695 to 849	ACCEPT.	7/14/05
27 Total Alkalinity (CaCO3)	n/a	n/a	EPA 310.1	104.0	104	mg/L	96.2 to 110	92.7 to 114	ACCEPT.	7/14/05
21 Total Dissolved Solids (TDS)	n/a	n/a	EPA 160.1	462.0	435	mg/L	389 to 481	366 to 504	ACCEPT.	7/14/05
22 Total Hardness (CaCO3)	n/a	n/a	SM3111B	182.0	181	mg/L	n/a	157 to 207	ACCEPT.	6/30/05
105 Total Solids*	n/a	n/a	EPA 160.3	485.0	447	mg/L	399 to 494	376 to 518	ACCEPT.	7/14/05
26 Potassium	-- Not Reported									
29 Fluoride	-- Not Reported									
30 Sulfate	-- Not Reported									
1550 Calcium Hardness	-- Not Reported									

PEI-028-1 Nutrients - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
31 Ammonia as N	n/a	n/a	EPA 350.2	3.46	3.43	mg/L	2.79 to 4.14	2.45 to 4.48	ACCEPT.	6/20/05
32 Nitrate as N	n/a	n/a	EPA 352.1	33.0	35.3	mg/L	30.0 to 40.0	27.5 to 42.5	ACCEPT.	6/20/05
33 Orthophosphate as P	n/a	n/a	EPA 365.2	0.997	0.970	mg/L	0.820 to 1.14	0.741 to 1.21	ACCEPT.	7/6/05
1820 Nitrate-nitrite as N	-- Not Reported --									

PEI-028-2 Nutrients - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
35 Total Phosphorus	n/a	n/a	EPA 365.2	9.35	9.75	mg/L	8.64 to 10.9	8.07 to 11.5	ACCEPT.	7/15/05
34 Total Kjeldahl Nitrogen	-- Not Reported --									

PEI-033 Total Residual Chlorine - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
98 Total Residual Chlorine	n/a	n/a	EPA 330.5	0.635	0.689	mg/L	0.561 to 0.805	0.500 to 0.866	ACCEPT.	7/18/05

PEI-034-1 Trace Metals - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
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1 Aluminum	n/a	n/a	SM3113B	1390.0	1370 ug/L	1200 to 1530	1120 to 1610	ACCEPT.	7/8/05
4 Cadmium	n/a	n/a	SM3113B	550.0	533 ug/L	480 to 580	455 to 605	ACCEPT.	7/6/05
6 Chromium	n/a	n/a	SM3113B	900.0	867 ug/L	794 to 942	756 to 980	ACCEPT.	6/30/05
7 Copper	n/a	n/a	SM3113B	187.0	217 ug/L	202 to 233	195 to 241	NOT ACCEPT.	6/30/05
8 Iron	n/a	n/a	SM3111B	1480.0	1500 ug/L	1390 to 1630	1330 to 1690	ACCEPT.	7/18/05
12 Lead	n/a	n/a	SM3113B	899.0	917 ug/L	841 to 989	804 to 1030	ACCEPT.	7/6/05
10 Manganese	n/a	n/a	SM3111B	1870.0	1830 ug/L	1710 to 1970	1650 to 2040	ACCEPT.	7/18/05
11 Nickel	n/a	n/a	SM3113B	1820.0	1800 ug/L	1700 to 1940	1620 to 2010	ACCEPT.	6/30/05
17 Silver	n/a	n/a	SM3113B	499.0	467 ug/L	423 to 513	401 to 535	ACCEPT.	7/6/05
15 Zinc	n/a	n/a	SM3111B	528.0	533 ug/L	483 to 589	457 to 615	ACCEPT.	6/30/05
2 Arsenic	-- Not Reported --								
3 Beryllium	-- Not Reported --								
5 Cobalt	-- Not Reported --								
13 Selenium	-- Not Reported --								
14 Vanadium	-- Not Reported --								
16 Antimony	-- Not Reported --								
18 Thallium	-- Not Reported --								
74 Molybdenum	-- Not Reported --								
75 Strontium	-- Not Reported --								
237 Barium	-- Not Reported --								

PEI-035 pH - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
19 pH	n/a	n/a	EPA 150.1	9.66	9.60	Units	n/a	9.40 to 9.80	ACCEPT.	7/14/05

PEI-079 Residue - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
72 Non-Filterable Residue (TSS)	n/a	n/a	EPA 160.2	61.2	66.3	mg/L	56.7 to 71.0	53.2 to 74.6	ACCEPT.	7/15/05

PEI-126 Settleable Solids - Clearwater Laboratory - NSI Solutions/WP-103

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
106 Settleable Solids*	n/a	n/a	EPA 160.5	8.25	9.00	mL/L	7.13 to 11.0	6.17 to 11.9	ACCEPT.	7/15/05

Scoring: Assigned values and acceptance limits for analytes included under the NVLAP Scope of Accreditation are determined according to the USEPA National Standards for Water Proficiency Testing Studies.

* Samples or analytes so identified are NOT part of the NVLAP Scope of Accreditation (Lab Code 200440-0) but are covered under our ISO 9001 registration meeting NELAC requirements.

Reviewed/Approved By: 

Date: 8.5.05

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**CWA - Non-Potable Water
Performance Evaluation Report
NSI Laboratory Proficiency Testing Program
Study WP-107 - Shipped: 11/03/2005 - Closed: 12/18/2005
Participant USEPA Labcode: ME00030**

JAN - 3 2006

Study Designed and Coordinated by:
NSI Solutions, Inc.
7517 Precision Drive, Suite 101, Raleigh, NC 27617
NVLAP Code: 200440-0
1-800-234-7837

This evaluation report is being submitted to:
Clearwater Laboratory
Attention: Marc Hein
153 Main Street
Newport, ME, 04953

LabCode and Accreditation Information:

Send Results to: State and EPA
EPA Lab Code: ME00030
State Lab Code:
Agency: Maine Department of Human Services
Attention: Mr. Matthew Sica
Address: 11 State House Station
City/State/Zip: Augusta, ME 04333
Reports to: ME

Participant Information

NSI Lab Code: N00190

This report was submitted by Marc Hein, Laboratory Manager.

Clearwater Laboratory
153 Main Street
Newport, ME, 04953

207-368-5786

Please contact Mark Hammersla at NSI if you have any questions about this report.
(800) 234-7837 - Mark.Hammersla@NSI-ES.com

This PT report may contain data not covered under NVLAP Accreditation.

PEI-026 Demand - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
BOD	n/a	n/a	USEPA 405.1	85.7	78.5	mg/L	52.5 to 104	39.6 to 117	ACCEPT.	11/30/05
COD	n/a	n/a	USEPA 410.4	123.0	127	mg/L	104 to 138	96.0 to 147	ACCEPT.	11/16/05
37 TOC	-- Not Reported --									
102 CBOD	-- Not Reported --									

PEI-027 Minerals - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
23 Calcium	n/a	n/a	SM3111B	4.8	4.00	mg/L	3.49 to 4.63	3.21 to 4.91	CK. FOR ERR.	12/14/05
28 Chloride	n/a	n/a	SM4500CL- B	48.5	47.7	mg/L	42.9 to 53.1	40.4 to 55.6	ACCEPT.	12/14/05
24 Magnesium	n/a	n/a	SM3111B	10.86	12.4	mg/L	11.2 to 13.6	10.6 to 14.2	CK. FOR ERR.	12/14/05
25 Sodium	n/a	n/a	SM3111B	60.5	63.2	mg/L	56.8 to 69.4	53.7 to 72.5	ACCEPT.	12/14/05
20 Specific Conductance (at 25C)	n/a	n/a	USEPA 120.1	516.0	497	umhos/cm	464 to 530	447 to 547	ACCEPT.	12/12/05
27 Total Alkalinity (CaCO3)	n/a	n/a	USEPA 310.1	108.0	104	mg/L	95.9 to 110	92.4 to 114	ACCEPT.	12/12/05
21 Total Dissolved Solids (TDS)	n/a	n/a	USEPA 160.1	260.0	286	mg/L	238 to 334	214 to 358	ACCEPT.	12/12/05
22 Total Hardness (CaCO3)	n/a	n/a	SM3111B	57.0	61.1	mg/L	n/a	51.5 to 70.8	ACCEPT.	12/14/05
105 Total Solids*	n/a	n/a	USEPA 160.3	268.0	281	mg/L	255 to 305	242 to 318	ACCEPT.	12/12/05
26 Potassium	-- Not Reported --									
29 Fluoride	-- Not Reported --									
30 Sulfate	-- Not Reported --									
1550 Calcium Hardness	-- Not Reported --									

PL-028-1 Nutrients - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
31 Ammonia as N	n/a	n/a	USEPA 350.2	0.957	1.00	mg/L	0.765 to 1.37	0.613 to 1.52	ACCEPT.	12/5/05
32 Nitrate as N	n/a	n/a	USEPA 352.1	2.67	3.00	mg/L	2.55 to 3.42	2.33 to 3.64	ACCEPT.	12/1/05
33 Orthophosphate as P	n/a	n/a	USEPA 365.2	3.73	3.83	mg/L	3.20 to 4.09	2.98 to 4.31	ACCEPT.	12/1/05
1820 Nitrate-nitrite as N	-- Not Reported --									

PEI-028-2 Nutrients - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
35 Total Phosphorus	n/a	n/a	USEPA 365.2	4.8	5.01	mg/L	4.42 to 5.66	4.11 to 5.97	ACCEPT.	12/9/05
34 Total Kjeldahl Nitrogen	-- Not Reported --									

PEI-033 Total Residual Chlorine - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
98 Total Residual Chlorine	n/a	n/a	USEPA 330.5	1.95	2.04	mg/L	1.63 to 2.34	1.46 to 2.51	ACCEPT.	12/14/05

PEI-034-1 Trace Metals - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
1 Aluminum	n/a	n/a	SM3113B	770.0	742	ug/L	640 to 841	589 to 891	ACCEPT.	12/13/05
4 Cadmium	n/a	n/a	SM3113B	432.0	430	ug/L	387 to 468	367 to 489	ACCEPT.	12/12/05
6 Chromium	n/a	n/a	SM3113B	908.0	890	ug/L	815 to 967	777 to 1010	ACCEPT.	12/9/05
7 Copper	n/a	n/a	SM3113B	620.0	615	ug/L	578 to 656	554 to 677	ACCEPT.	12/5/05
8 Iron	n/a	n/a	SM3111B	387.0	405	ug/L	373 to 444	355 to 462	ACCEPT.	12/5/05
12 Lead	n/a	n/a	SM3113B	1710.0	1720	ug/L	1580 to 1850	1510 to 1920	ACCEPT.	12/12/05
10 Manganese	n/a	n/a	SM3111B	2600.0	2600	ug/L	2430 to 2800	2340 to 2890	ACCEPT.	12/5/05
11 Nickel	n/a	n/a	SM3113B	686.0	680	ug/L	637 to 736	612 to 761	ACCEPT.	12/5/05
17 Silver	n/a	n/a	SM3113B	553.0	570	ug/L	517 to 626	489 to 653	ACCEPT.	12/12/05
15 Zinc	n/a	n/a	SM3111B	452.0	475	ug/L	431 to 525	407 to 549	ACCEPT.	12/5/05
2 Arsenic	-- Not Reported --									
3 Beryllium	-- Not Reported --									
5 Cobalt	-- Not Reported --									
13 Selenium	-- Not Reported --									
14 Vanadium	-- Not Reported --									
16 Antimony	-- Not Reported --									
18 Thallium	-- Not Reported --									
74 Molybdenum	-- Not Reported --									
75 Strontium	-- Not Reported --									
237 Barium	-- Not Reported --									

PEI-035 pH - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
19 pH	n/a	n/a	USEPA 150.1	9.03	9.00	Units	n/a	8.80 to 9.20	ACCEPT.	11/28/05

PEI-079 Residue - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
72 Non-Filterable Residue (TSS)	n/a	n/a	USEPA 160.2	86.0	92.5	mg/L	80.6 to 98.1	76.3 to 102	ACCEPT.	11/28/05

PEI-126 Settleable Solids - Clearwater Laboratory - NSI Solutions/WP-107

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Warning Limits	Acceptance Limits	Evaluation	Analysis Date
106 Settleable Solids*	n/a	n/a	USEPA 160.5	27.0	27.0	mL/L	23.4 to 32.4	21.2 to 34.7	ACCEPT.	11/28/05

Assigned Values

All assigned values are established in a manner compliant with the current NELAC FOT for Non-Potable Water. With the exception of TDS and Specific Conductance assigned values are equal to the analytically verified gravimetric true value of the PT sample. For TDS and Specific Conductance, the assigned value is set at the robust study mean.

Sample Accuracy

The accuracy of each analyte assigned value is verified analytically by NSI Solutions, Inc. prior to shipment. This analytical process requires that the mean of at least nine sample analyses falls within a window defined as 1/3 the acceptance limit for participating labs at the assigned value to a maximum of 10%.

Batch Homogeneity

In addition to analyte accuracy, the homogeneity of each analyte is verified prior to shipment. Homogeneity refers to the equivalence of assigned values throughout the production run and is crucial for the assurance that all participating laboratories be treated equally. This process is accomplished by analysis of at least nine samples taken from the production run. The %RSD of these replicate analyses must fall within a window defined as 1/6 the acceptance limits for participating labs at the assigned value to a maximum of 5%.

Stability

Each analyte is analytically verified as stable at the close of the study.

Acceptance Limits

Acceptance limits for each analyte are set at ± 3 standard deviations around the expected study mean as per the current NELAC standards.

- * Samples or analytes so identified are NOT part of the NVLAP Scope of Accreditation (Lab Code 200440-0) but are covered under our ISO 9001 registration meeting NELAC requirements.

Reviewed/Approved By: MRHSC

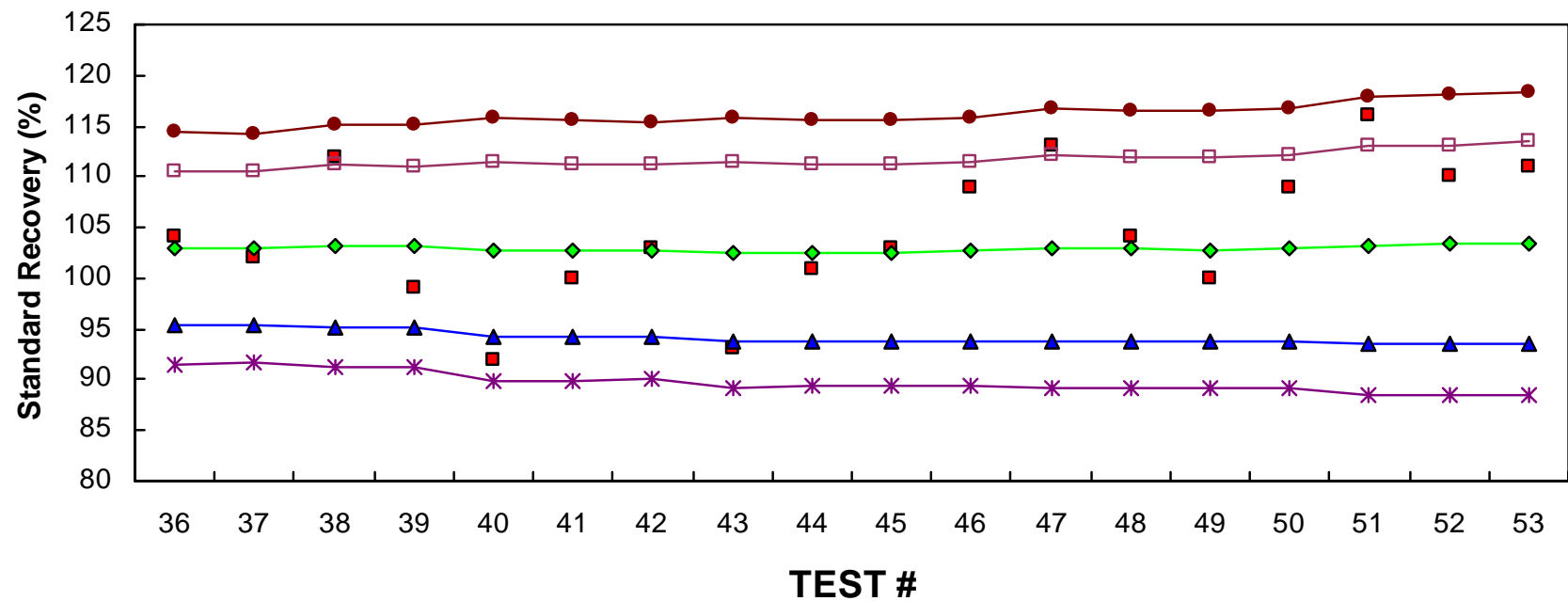
Date: 12/28/05

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CONTROL CHART FOR CLEARWATER LAB LOW-LEVEL TOTAL PHOS. QC DATA 2005
ANALYTE: TOTAL PHOSPHORUS - LOW LEVEL STANDARD RECOVERY
METHOD: EPA 365.2

TEST #	TEST DATE	Standard (%Rec.)	CENTRAL TENDENCY (MEAN)	2xSTD. DEV (n-1)	LOWER WARNING LIMIT	UPPER WARNING LIMIT	C.V. (%)	LOWER CONTROL LIMIT	UPPER CONTROL LIMIT
36	08/25/05	104	103.00	7.60	95	111	3.7	92	114
37	09/01/05	102	102.97	7.51	95	110	3.6	92	114
38	09/01/05	112	103.21	7.96	95	111	3.9	91	115
39	09/06/05	99	103.10	7.97	95	111	3.9	91	115
40	09/06/05	92	102.83	8.62	94	111	4.2	90	116
41	09/12/05	100	102.76	8.55	94	111	4.2	90	116
42	09/12/05	103	102.76	8.45	94	111	4.1	90	115
43	09/22/05	93	102.53	8.86	94	111	4.3	89	116
44	09/22/05	101	102.50	8.77	94	111	4.3	89	116
45	10/01/05	103	102.51	8.67	94	111	4.2	90	116
46	10/01/05	109	102.65	8.79	94	111	4.3	89	116
47	10/01/05	113	102.87	9.20	94	112	4.5	89	117
48	10/14/05	104	102.90	9.11	94	112	4.4	89	117
49	10/14/05	100	102.84	9.05	94	112	4.4	89	116
50	10/28/05	109	102.96	9.12	94	112	4.4	89	117
51	10/28/05	116	103.22	9.74	93	113	4.7	89	118
52	11/18/05	110	103.35	9.83	94	113	4.8	89	118
53	11/18/05	111	103.49	9.96	94	113	4.8	89	118
54	12/08/05	101	103.44	9.89	94	113	4.8	89	118
55	12/08/05	104	103.45	9.80	94	113	4.7	89	118
56	12/29/05	90	103.21	10.35	93	114	5.0	88	119
57	12/29/05	96	103.09	10.44	93	114	5.1	87	119

QUALITY CONTROL CHART *Low-Level TOTAL-P Standard Recovery*



■ % Rec
 ◆ AVE.
 ▲ lower warning
 ◻ upper warning
 ✱ lower control
 ● upper control

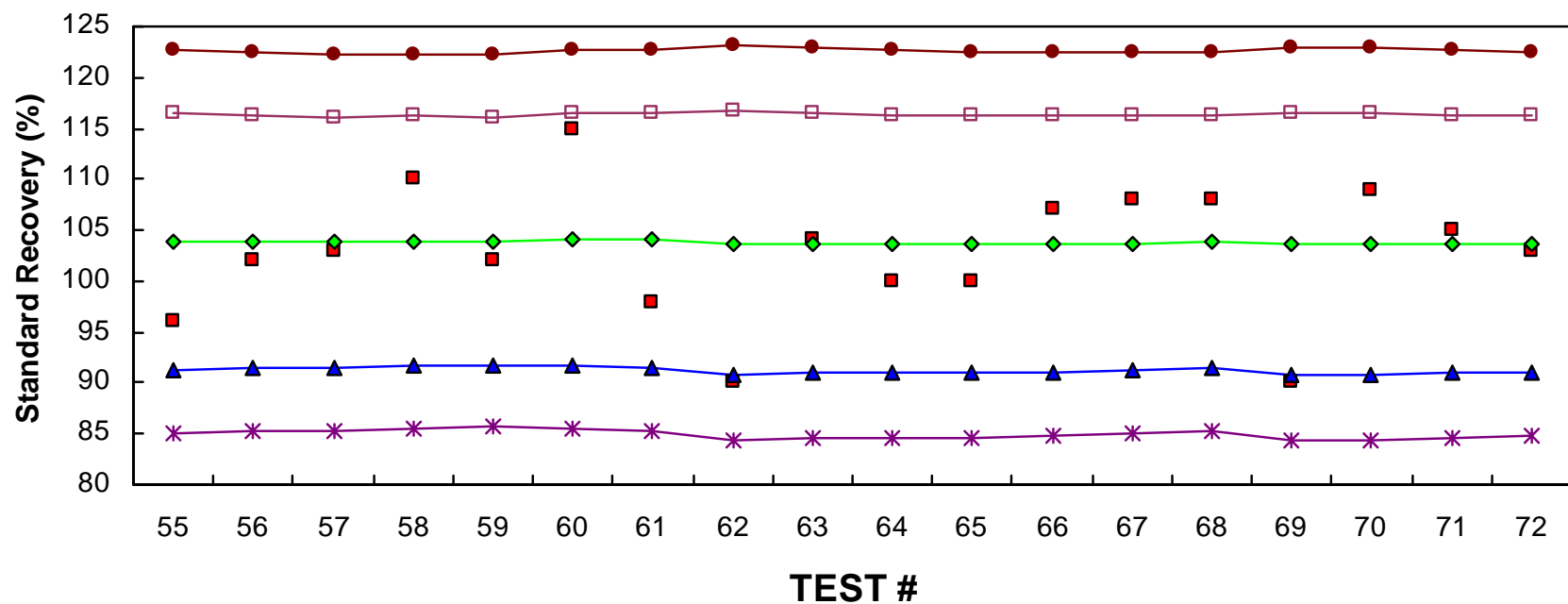
Acheron

CONTROL CHART FOR CLEARWATER LAB LOW-LEVEL TOTAL PHOS. QC DATA 2005**ANALYTE: TOTAL PHOSPHORUS - LOW LEVEL MATRIX SPIKE RECOVERY****METHOD: EPA 365.2**

TEST #	TEST DATE	Matrix Spike (%Rec.)	CENTRAL TENDENCY (MEAN)	2xSTD. DEV (n-1)	LOWER WARNING LIMIT	UPPER WARNING LIMIT	C.V. (%)	LOWER CONTROL LIMIT	UPPER CONTROL LIMIT
55	08/16/05	96	103.87	12.54	91	116	6.0	85	123
56	08/18/05	102	103.83	12.41	91	116	6.0	85	122
57	08/18/05	103	103.81	12.28	92	116	5.9	85	122
58	08/25/05	110	103.94	12.28	92	116	5.9	86	122
59	08/25/05	102	103.90	12.16	92	116	5.9	86	122
60	09/01/05	115	104.12	12.44	92	117	6.0	85	123
61	09/01/05	98	104.00	12.43	92	116	6.0	85	123
62	09/06/05	90	103.73	12.91	91	117	6.2	84	123
63	09/06/05	104	103.74	12.78	91	117	6.2	85	123
64	09/12/05	100	103.67	12.70	91	116	6.1	85	123
65	09/12/05	100	103.60	12.62	91	116	6.1	85	123
66	09/22/05	107	103.66	12.54	91	116	6.0	85	122
67	09/22/05	108	103.74	12.48	91	116	6.0	85	122
68	09/22/05	108	103.81	12.42	91	116	6.0	85	122
69	09/22/05	90	103.58	12.83	91	116	6.2	84	123
70	10/01/05	109	103.67	12.80	91	116	6.2	84	123
71	10/01/05	105	103.69	12.69	91	116	6.1	85	123
72	10/01/05	103	103.68	12.59	91	116	6.1	85	123
73	10/01/05	110	103.78	12.59	91	116	6.1	85	123
74	10/01/05	107	103.83	12.52	91	116	6.0	85	123
75	10/01/05	109	103.91	12.48	91	116	6.0	85	123
76	10/01/05	107	103.95	12.41	92	116	6.0	85	123

QUALITY CONTROL CHART

Low-Level TOTAL-P Matrix Spike Recovery



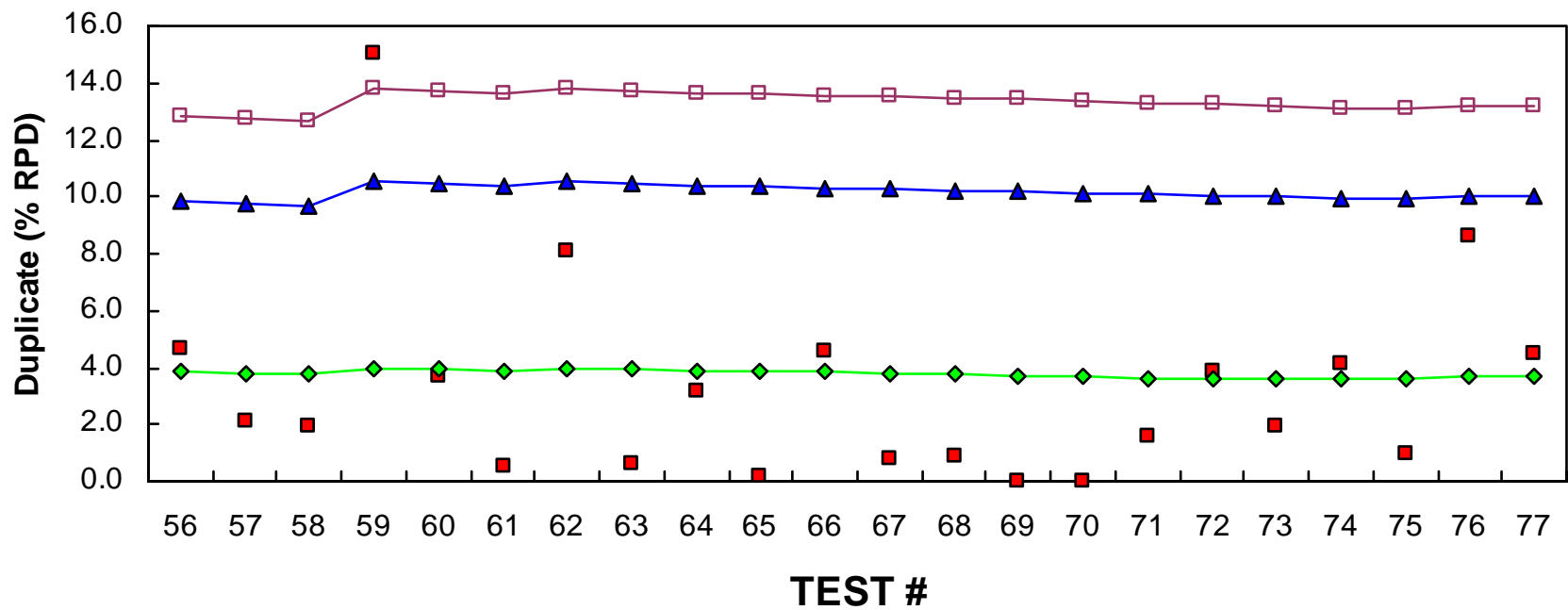
■ % Rec ◆ AVE. ▲ lower warning □ upper warning * lower control ● upper control

Acheron

CONTROL CHART FOR CLEARWATER LAB LOW LEVEL TOTAL-P DUPLICATE QC DATA 2005**ANALYTE: TOTAL PHOSPHORUS LOW LEVEL DUPLICATE****METHOD: EPA 365.2**

TEST #	TEST DATE	LL TP DUP (%RPD)	CENTRAL TENDENCY (MEAN)	2xSTD.DEV (n-1)	UPPER WARNING LIMIT	UPPER CONTROL LIMIT
56	09/12/05	4.7	3.84	5.98	9.8	12.8
57	09/12/05	2.1	3.81	5.95	9.8	12.7
58	09/22/05	1.9	3.78	5.92	9.7	12.7
59	09/22/05	15.0	3.97	6.55	10.5	13.8
60	09/22/05	3.7	3.96	6.50	10.5	13.7
61	09/22/05	0.5	3.91	6.50	10.4	13.7
62	10/01/05	8.1	3.97	6.54	10.5	13.8
63	10/01/05	0.6	3.92	6.54	10.5	13.7
64	10/01/05	3.2	3.91	6.49	10.4	13.6
65	10/01/05	0.2	3.85	6.51	10.4	13.6
66	10/01/05	4.6	3.86	6.46	10.3	13.6
67	10/01/05	0.8	3.82	6.45	10.3	13.5
68	10/01/05	0.9	3.78	6.44	10.2	13.4
69	10/14/05	<DL	3.72	6.46	10.2	13.4
70	10/14/05	0.0	3.67	6.47	10.1	13.4
71	10/28/05	1.6	3.64	6.45	10.1	13.3
72	10/28/05	3.9	3.64	6.40	10.0	13.2
73	10/28/05	1.9	3.62	6.37	10.0	13.2
74	11/18/05	4.1	3.62	6.33	10.0	13.1
75	11/18/05	1.0	3.59	6.31	9.9	13.1
76	12/08/05	8.6	3.66	6.38	10.0	13.2
77	12/29/05	4.5	3.67	6.34	10.0	13.2

QUALITY CONTROL CHART *LOW LEVEL TOTAL-P DUPLICATES*



■ Duplicate RPD% ◆ AVE. ▲ Warning Limit □ Control Limit

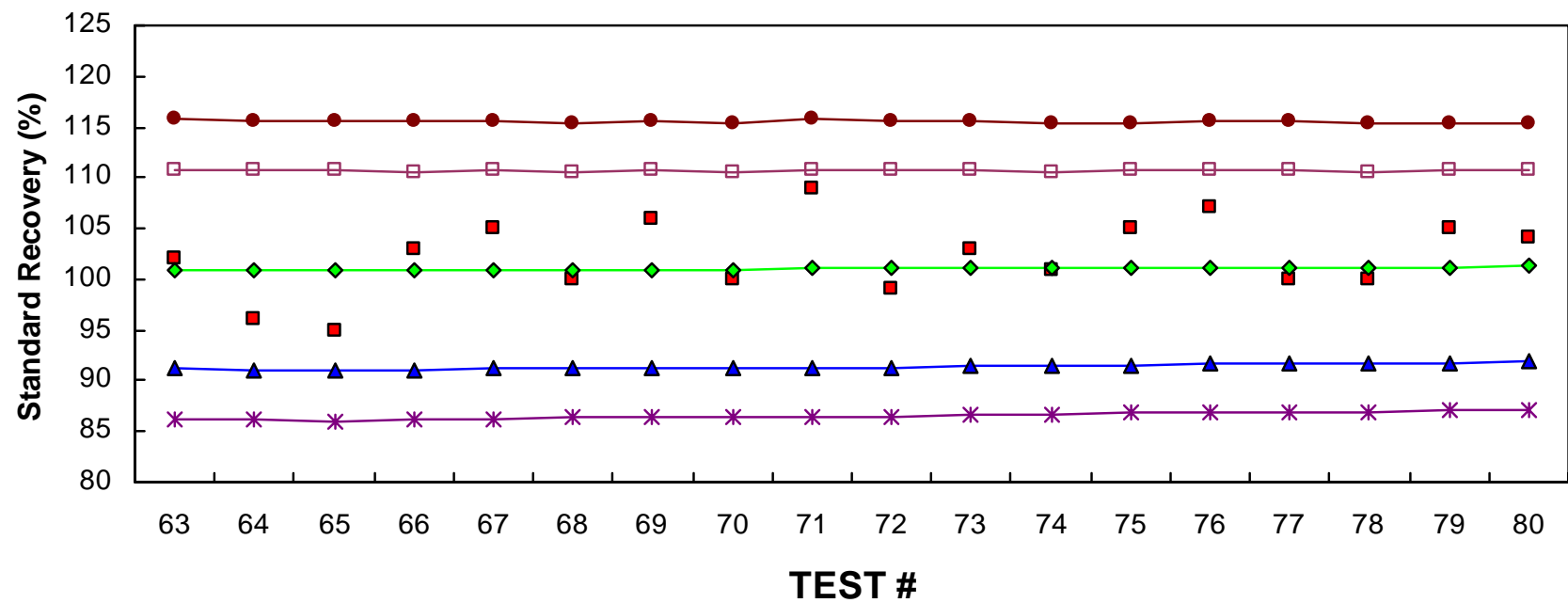
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CONTROL CHART FOR CLEARWATER LAB LOW-LEVEL ORTHO PHOS. QC DATA 2005**ANALYTE: ORTHO PHOSPHORUS - LOW LEVEL STANDARD RECOVERY****METHOD: EPA 365.2**

TEST #	TEST DATE	Standard (%Rec.)	CENTRAL TENDENCY (MEAN)	2xSTD. DEV (n-1)	LOWER WARNING LIMIT	UPPER WARNING LIMIT	C.V. (%)	LOWER CONTROL LIMIT	UPPER CONTROL LIMIT
63	08/15/05	102	100.98	9.82	91	111	4.9	86	116
64	08/16/05	96	100.91	9.82	91	111	4.9	86	116
65	08/17/05	95	100.82	9.85	91	111	4.9	86	116
66	08/18/05	103	100.85	9.79	91	111	4.9	86	116
67	08/23/05	105	100.91	9.77	91	111	4.8	86	116
68	08/23/05	100	100.90	9.70	91	111	4.8	86	115
69	08/24/05	106	100.97	9.71	91	111	4.8	86	116
70	08/24/05	100	100.96	9.64	91	111	4.8	86	115
71	08/25/05	109	101.07	9.76	91	111	4.8	86	116
72	08/26/05	99	101.04	9.70	91	111	4.8	86	116
73	08/30/05	103	101.07	9.65	91	111	4.8	87	116
74	08/30/05	101	101.07	9.58	91	111	4.7	87	115
75	08/31/05	105	101.12	9.56	92	111	4.7	87	115
76	08/31/05	107	101.20	9.59	92	111	4.7	87	116
77	09/01/05	100	101.18	9.53	92	111	4.7	87	115
78	09/01/05	100	101.17	9.47	92	111	4.7	87	115
79	09/07/05	105	101.22	9.45	92	111	4.7	87	115
80	09/07/05	104	101.25	9.41	92	111	4.6	87	115
81	09/14/05	97	101.20	9.40	92	111	4.6	87	115
82	09/21/05	98	101.16	9.37	92	111	4.6	87	115
83	09/22/05	100	101.14	9.31	92	110	4.6	87	115
84	09/28/05	97	101.10	9.30	92	110	4.6	87	115

QUALITY CONTROL CHART

Low-Level ORTHO-P Standard Recovery



■ % Rec ◆ AVE. ▲ lower warning □ upper warning * lower control ● upper control

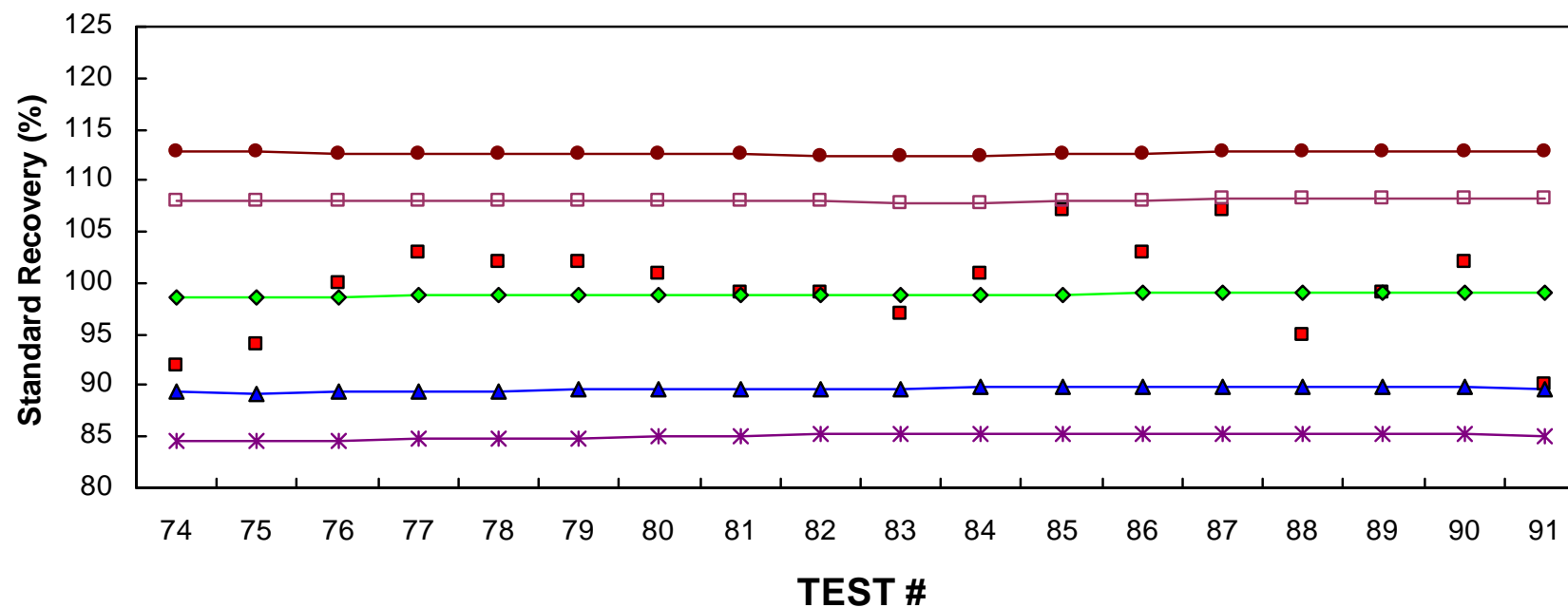
Acheron

CONTROL CHART FOR CLEARWATER LAB LOW-LEVEL ORTHO PHOS. QC DATA 2005**METHOD: ORTHO-PHOSPHORUS - LOW LEVEL MATRIX SPIKE RECOVERY****ANALYTE: EPA 365.2**

TEST	TEST	Matrix	CENTRAL		LOWER	UPPER		LOWER	UPPER
#	DATE	Spike	TENDENCY	2xSTD.DEV	WARNING	WARNING	C.V.	CONTROL	CONTROL
		(%Rec.)	(MEAN)	(n-1)	LIMIT	LIMIT	(%)	LIMIT	LIMIT
74	08/17/05	92	98.70	9.39	89	108	4.8	85	113
75	08/17/05	94	98.64	9.39	89	108	4.8	85	113
76	08/17/05	100	98.66	9.33	89	108	4.7	85	113
77	08/18/05	103	98.71	9.32	89	108	4.7	85	113
78	08/23/05	102	98.76	9.29	89	108	4.7	85	113
79	08/24/05	102	98.80	9.26	90	108	4.7	85	113
80	08/24/05	101	98.83	9.22	90	108	4.7	85	113
81	08/24/05	99	98.83	9.16	90	108	4.6	85	113
82	08/25/05	99	98.83	9.10	90	108	4.6	85	112
83	08/26/05	97	98.81	9.06	90	108	4.6	85	112
84	08/30/05	101	98.83	9.01	90	108	4.6	85	112
85	08/31/05	107	98.93	9.13	90	108	4.6	85	113
86	08/31/05	103	98.98	9.12	90	108	4.6	85	113
87	09/01/05	107	99.07	9.23	90	108	4.7	85	113
88	09/01/05	95	99.02	9.22	90	108	4.7	85	113
89	09/01/05	99	99.02	9.17	90	108	4.6	85	113
90	09/07/05	102	99.06	9.13	90	108	4.6	85	113
91	09/14/05	90	98.96	9.28	90	108	4.7	85	113
92	09/14/05	94	98.90	9.29	90	108	4.7	85	113
93	09/21/05	97	98.88	9.24	90	108	4.7	85	113
94	09/22/05	104	98.94	9.26	90	108	4.7	85	113
95	09/28/05	96	98.91	9.23	90	108	4.7	85	113

QUALITY CONTROL CHART

Low-Level ORTHO-P Matrix Spike Recovery



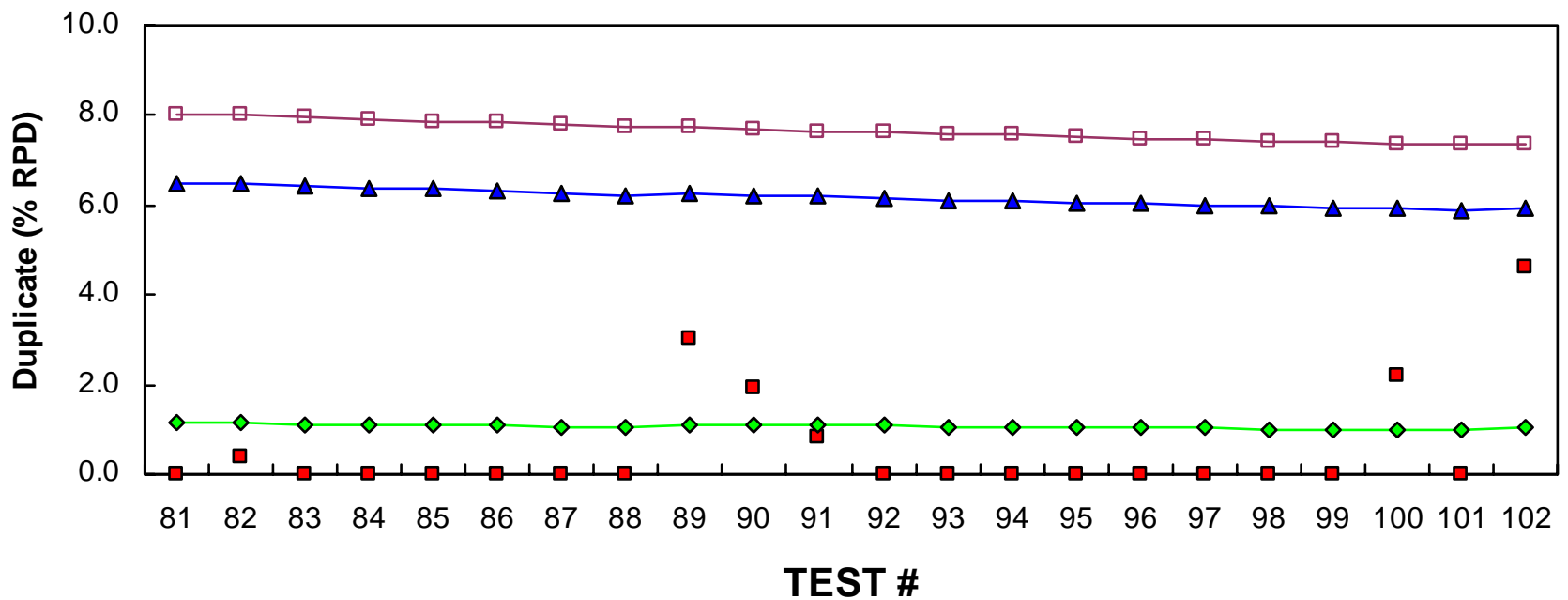
■ % Rec ◆ AVE. ▲ lower warning □ upper warning * lower control ● upper control

CONTROL CHART FOR CLEARWATER LAB LOW LEVEL ORTHO-P DUPLICATE QC DATA 2005**ANALYTE: ORTHO-PHOSPHORUS LOW LEVEL DUPLICATE****METHOD: EPA 365.2**

TEST #	TEST DATE	LL ORTHO-P DUP (%RPD)	CENTRAL TENDENCY (MEAN)	2xSTD.DEV (n-1)	UPPER WARNING LIMIT	UPPER CONTROL LIMIT
81	08/17/05	<DL	1.15	5.36	6.5	8.0
82	08/18/05	0.4	1.14	5.33	6.5	8.0
83	08/18/05	<DL	1.12	5.30	6.4	8.0
84	08/23/05	<DL	1.11	5.28	6.4	7.9
85	08/24/05	<DL	1.10	5.25	6.3	7.9
86	08/24/05	0.0	1.08	5.23	6.3	7.8
87	08/24/05	<DL	1.07	5.20	6.3	7.8
88	08/24/05	<DL	1.06	5.18	6.2	7.8
89	08/25/05	3.0	1.08	5.16	6.2	7.7
90	08/25/05	1.9	1.09	5.14	6.2	7.7
91	08/26/05	0.8	1.09	5.11	6.2	7.7
92	08/30/05	<DL	1.08	5.09	6.2	7.6
93	08/31/05	<DL	1.06	5.06	6.1	7.6
94	08/31/05	<DL	1.05	5.04	6.1	7.6
95	09/01/05	<DL	1.04	5.02	6.1	7.5
96	09/01/05	<DL	1.03	5.00	6.0	7.5
97	09/01/05	<DL	1.02	4.97	6.0	7.5
98	09/01/05	<DL	1.01	4.95	6.0	7.4
99	09/14/05	<DL	1.00	4.93	5.9	7.4
100	09/21/05	2.2	1.01	4.91	5.9	7.4
101	09/22/05	<DL	1.00	4.89	5.9	7.3
102	09/28/05	4.6	1.04	4.92	6.0	7.4

QUALITY CONTROL CHART

LOW LEVEL ORTHO-P DUPLICATES



■ Duplicate RPD% ◆ AVE. ▲ Warning Limit □ Control Limit

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**CLEARWATER LABORATORY
LOW LEVEL TOTAL PHOSPHORUS
MDL CALCULATION TABLE**

Number	Column A	Column B
1	Analyte	LL Total-P
2	Method	EPA 365.2
3	Date	05/06/05
4	Instrument	DR4000
5	Spike Concentration	4
6	Units	ppb
7	Replicate 1	6.03
8	Replicate 2	5.02
9	Replicate 3	4.79
10	Replicate 4	4.77
11	Replicate 5	5.18
12	Replicate 6	4.69
13	Replicate 7	4.8
14	Replicate 8	5.58
15	Replicate 9	
16	Number of Values(n)	8
17	Mean	5.108
18	Sample Std Dev (s)	0.473701232
19	Critical Value (Tn)	2.1
20	Outlier Above	6.103
21	Outlier Below	4.113
22	Students' t Value	3
23	MDL	1.421
24	LOQ	4.737
25	High Spike Check	
26	Low Spike Check	
27	Minimum of 7 Replicates	
28	S/N	10.78
29	Analyst Name	RAB

**CLEARWATER LABORATORY
ORTHO-PHOSPHORUS
MDL CALCULATION TABLE**

Number	Column A	Column B
1	Analyte	Ortho-P
2	Method	SM 4500 PE
3	Date	06/30/05
4	Instrument	DR4000
5	Spike Concentration	4
6	Units	ppb
7	Replicate 1	4.34
8	Replicate 2	3.72
9	Replicate 3	3.62
10	Replicate 4	4.06
11	Replicate 5	4.33
12	Replicate 6	3.68
13	Replicate 7	3.58
14	Replicate 8	4.34
15	Replicate 9	
16	Number of Values(n)	8
17	Mean	3.959
18	Sample Std Dev (s)	0.344691891
19	Critical Value (Tn)	2.1
20	Outlier Above	4.683
21	Outlier Below	3.235
22	Students' t Value	3
23	MDL	1.034
24	LOQ	3.447
25	High Spike Check	.4 ppm
26	Low Spike Check	
27	Minimum of 7 Replicates	
28	S/N	11.49
29	Analyst Name	MS

**CLEARWATER LAB LOW LEVEL TOTAL PHOSPHORUS
METHOD BLANKS 2005**

Blank Water brand key: PS = Poland Spring

Brand	Test Date	Measured Value	Units	Reported Result	Action Taken
PS	05/13/05	-0.37	ppb	<DL	none
PS	05/27/05	0	ppb	<DL	none
PS	05/27/05	1.81	ppb	2	none
PS	05/31/05	-0.1	ppb	<DL	none
PS	06/07/05	3	ppb	3	re-run
PS	06/10/05	0	ppb	<DL	none
PS	06/21/05	-2.94	ppb	> 0-DL	zeroed
PS	06/25/05	-0.16	ppb	<DL	zeroed
PS	06/25/05	0.03	ppb	<DL	none
PS	07/01/05	0	ppb	<DL	none
PS	07/09/05	-0.17	ppb	<DL	none
PS	07/14/05	0	ppb	<DL	none
PS	07/19/05	-0.51	ppb	<DL	none
PS	07/22/05	-0.4	ppb	<DL	none
PS	07/28/05	-1.2	ppb	> 0-DL	none
PS	08/04/05	1.36	ppb	1	none
PS	08/04/05	0.44	ppb	<DL	none
PS	08/11/05	-0.25	ppb	<DL	none
PS	08/16/05	-0.83	ppb	<DL	none
PS	08/18/05	-0.6	ppb	<DL	none
PS	09/01/05	-0.07	ppb	<DL	zeroed
PS	09/01/05	0	ppb	<DL	none
PS	09/06/05	-0.97	ppb	<DL	none
PS	09/22/05	-0.88	ppb	<DL	zeroed
PS	10/01/05	-5.23	ppb	> 0-DL	zeroed
PS	10/14/05	0.51	ppb	<DL	none
PS	10/28/05	0.8	ppb	<DL	none
PS	11/18/05	-2.82	ppb	> 0-DL	zeroed

CLEARWATER LAB LOW LEVEL ORTHO-PHOSPHORUS METHOD BLANKS 2005

Blank Water brand key: PS = Poland Spring

Brand	Test Date	Measured Value	Units	Reported Result	Action Taken	Brand	Test Date	Measured Value	Units	Reported Result	Action Taken
PS	06/01/05	-0.63	ppb	<DL	none	PS	07/20/05	-0.38	ppb	<DL	zeroed
PS	06/01/05	-0.46	ppb	<DL	none	PS	07/20/05	-0.10	ppb	<DL	zeroed
PS	06/02/05	-0.65	ppb	<DL	none	PS	07/21/05	0.00	ppb	<DL	none
PS	06/08/05	-0.64	ppb	<DL	none	PS	07/21/05	-0.20	ppb	<DL	zeroed
PS	06/08/05	-0.46	ppb	<DL	none	PS	07/26/05	0.00	ppb	<DL	none
PS	06/15/05	0.00	ppb	<DL	none	PS	07/26/05	-0.14	ppb	<DL	zeroed
PS	06/15/05	0.00	ppb	<DL	none	PS	07/26/05	0.00	ppb	<DL	none
PS	06/15/05	0.00	ppb	<DL	none	PS	07/27/05	0.00	ppb	<DL	none
PS	06/16/05	0.00	ppb	<DL	none	PS	07/27/05	-0.39	ppb	<DL	none
PS	06/16/05	1.61	ppb	>DL	re-run curve & samples	PS	07/27/05	-0.09	ppb	<DL	none
PS	06/16/05	0.00	ppb	<DL	none	PS	07/28/05	0.40	ppb	<DL	zeroed
PS	06/20/05	0.04	ppb	<DL	none	PS	07/28/05	-0.03	ppb	<DL	zeroed
PS	06/20/05	0.18	ppb	<DL	none	PS	07/28/05	0.04	ppb	<DL	none
PS	06/20/05	0.20	ppb	<DL	none	PS	08/02/05	0.00	ppb	<DL	none
PS	06/21/05	0.02	ppb	<DL	none	PS	08/02/05	0.00	ppb	<DL	none
PS	06/21/05	-0.15	ppb	<DL	zeroed	PS	08/03/05	0.00	ppb	<DL	none
PS	06/21/05	0.63	ppb	<DL	none	PS	08/03/05	0.01	ppb	<DL	none
PS	06/22/05	0.40	ppb	<DL	none	PS	08/03/05	0.00	ppb	<DL	none
PS	06/22/05	-0.04	ppb	<DL	zeroed	PS	08/03/05	0.00	ppb	<DL	none
PS	06/22/05	-0.06	ppb	<DL	zeroed	PS	08/03/05	0.00	ppb	<DL	none
PS	06/22/05	0.12	ppb	<DL	none	PS	08/04/05	0.00	ppb	<DL	none
PS	06/22/05	0.00	ppb	<DL	none	PS	08/04/05	0.15	ppb	<DL	none
PS	06/23/05	0.01	ppb	<DL	none	PS	08/04/05	0.03	ppb	<DL	none
PS	06/23/05	0.00	ppb	<DL	none	PS	08/05/05	0.00	ppb	<DL	none
PS	06/28/05	0.07	ppb	<DL	none	PS	08/05/05	-0.34	ppb	<DL	none
PS	06/28/05	0.00	ppb	<DL	none	PS	08/05/05	-0.01	ppb	<DL	none
PS	06/28/05	0.07	ppb	<DL	none	PS	08/09/05	0.00	ppb	<DL	none
PS	06/28/05	-0.02	ppb	<DL	zeroed	PS	08/09/05	0.08	ppb	<DL	none
PS	06/30/05	-0.01	ppb	<DL	none	PS	08/10/05	0.00	ppb	<DL	none

PS	06/30/05	0.05	ppb	<DL	none	PS	08/10/05	-0.07	ppb	<DL	zeroed
PS	06/30/05	0.04	ppb	<DL	none	PS	08/11/05	0.00	ppb	<DL	none
PS	06/30/05	0.00	ppb	<DL	none	PS	08/11/05	0.08	ppb	<DL	none
PS	06/30/05	-0.39	ppb	<DL	zeroed	PS	08/12/05	0.00	ppb	<DL	none
PS	06/30/05	0.13	ppb	<DL	none	PS	08/12/05	0.00	ppb	<DL	none
PS	07/01/05	0.00	ppb	<DL	none	PS	08/15/05	0.00	ppb	<DL	none
PS	07/01/05	0.00	ppb	<DL	none	PS	08/15/05	-0.02	ppb	<DL	none
PS	07/01/05	0.12	ppb	<DL	none	PS	08/16/05	0.00	ppb	<DL	none
PS	07/06/05	0.04	ppb	<DL	none	PS	08/16/05	0.00	ppb	<DL	none
PS	07/06/05	-0.03	ppb	<DL	zeroed	PS	08/17/05	0.00	ppb	<DL	none
PS	07/06/05	0.09	ppb	<DL	none	PS	08/17/05	0.00	ppb	<DL	none
PS	07/06/05	0.00	ppb	<DL	none	PS	08/17/05	0.04	ppb	<DL	none
PS	07/06/05	0.00	ppb	<DL	none	PS	08/18/05	0.00	ppb	<DL	none
PS	07/06/05	-0.08	ppb	<DL	zeroed	PS	08/18/05	0.06	ppb	<DL	none
PS	07/07/05	0.00	ppb	<DL	none	PS	08/23/05	0.00	ppb	<DL	none
PS	07/07/05	0.05	ppb	<DL	none	PS	08/23/05	0.05	ppb	<DL	none
PS	07/07/05	0.00	ppb	<DL	none	PS	08/24/05	0.01	ppb	<DL	none
PS	07/08/05	0.00	ppb	<DL	none	PS	08/24/05	0.00	ppb	<DL	none
PS	07/08/05	0.07	ppb	<DL	none	PS	08/25/05	0.00	ppb	<DL	none
PS	07/08/05	0.50	ppb	<DL	none	PS	08/25/05	0.00	ppb	<DL	none
PS	07/11/05	0.00	ppb	<DL	none	PS	08/26/05	0.00	ppb	<DL	none
PS	07/11/05	0.00	ppb	<DL	none	PS	08/30/05	0.00	ppb	<DL	none
PS	07/11/05	0.08	ppb	<DL	none	PS	08/30/05	-0.07	ppb	<DL	zeroed
PS	07/12/05	0.00	ppb	<DL	none	PS	08/31/05	0.00	ppb	<DL	none
PS	07/12/05	0.00	ppb	<DL	none	PS	08/31/05	0.06	ppb	<DL	none
PS	07/12/05	0.32	ppb	<DL	none	PS	09/01/05	0.00	ppb	<DL	none
PS	07/13/05	0.00	ppb	<DL	none	PS	09/01/05	0.18	ppb	<DL	none
PS	07/13/05	-0.51	ppb	<DL	none	PS	09/01/05	0.00	ppb	<DL	none
PS	07/13/05	0.44	ppb	<DL	none	PS	09/01/05	-0.56	ppb	<DL	zeroed
PS	07/15/05	0.00	ppb	<DL	none	PS	09/07/05	0.00	ppb	<DL	none
PS	07/15/05	-0.04	ppb	<DL	zeroed	PS	09/07/05	-0.08	ppb	<DL	zeroed
PS	07/15/05	0.00	ppb	<DL	none	PS	09/14/05	0.00	ppb	<DL	none
PS	07/19/05	0.00	ppb	<DL	none	PS	09/14/05	0.00	ppb	<DL	none

PS	07/19/05	-0.23	ppb	<DL	zeroed	PS	09/21/05	0.00	ppb	<DL	none
PS	07/19/05	-0.12	ppb	<DL	zeroed	PS	09/21/05	-0.29	ppb	<DL	zeroed
PS	07/20/05	0.39	ppb	<DL	zeroed	PS	09/22/05	0.00	ppb	<DL	none
PS	07/20/05	0.34	ppb	<DL	zeroed	PS	09/22/05	0.00	ppb	<DL	none
PS	07/20/05	0.42	ppb	<DL	zeroed	PS	09/28/05	0.00	ppb	<DL	none
PS	07/20/05	0.00	ppb	<DL	none	PS	09/28/05	0.00	ppb	<DL	none